

# THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—47TH YEAR

SYDNEY, SATURDAY, AUGUST 13, 1960

No. 7

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### WHAT IS HIATUS HERNIA?

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This devil's web that, cleaving to my side,  
Hath ate my flesh within, hath drained the tide  
That swelleth through my lungs, made its abode  
Deep in the bone and drunk my leaping blood,  
Till all my body is a wreck, alive.

—Sophocles.

HIATUS HERNIA is a subject which is of increasing importance, in that the frequency with which the diagnosis is being made has increased some hundredfold in the last forty years; but the upsurge in quantity has not been accompanied by any improvement in diagnostic quality. The study of these cases has been in the hands of physicians, surgeons, endoscopists and radiologists, and it is not surprising that many conflicting opinions have been expressed as to the nature and treatment of this condition, not the least of the differences being the divergent views of thoracic and abdominal surgeons. Radiologists have contributed much to the diagnosis of the lesions; but, when confronted with smaller and less

obvious defects where the differentiation from the normal involves complex problems of anatomy and physiology, the radiological observers have often found it impossible to answer the two questions: "Is this an hiatus hernia, and, if so, what is hiatus hernia?" It is, therefore, intended to review some previous work on the subject, and to make some attempt to clarify the doubtful and the contentions in an endeavour to find some answer to the questions posed above.

#### Classification.

For the purpose of this paper the revised classification of Hagarty (1960) will be followed, in which the herniæ are classified as follows: (i) bell hernia; (ii) para-oesophageal hernia; (iii) massive hernia.

The bell hernia is identical with the pulsion type of Harrington (1940-1943) and the sliding hernia described by Allison (1951); but the purely descriptive term "bell" avoids speculation as to the aetiology of the lesion, such as was indulged in by Harrington, or as to its behaviour, on which subject Allison suggested that the hernia engaged in sliding and that the oesophagus was short, although other operators failed to confirm these findings (Belsey, 1952; and Sweet, 1948 and 1952). It is thought best to drop the expression "sliding hernia with congenital short oesophagus", as the hernia rarely slides, the lesions are not congenital and the oesophagus is not short. The

term "para-oesophageal hernia" used by Dubs (1919) and later by Akerlund (1926-1932) is retained, as it very clearly indicates the sweep of the oesophagus down the medial side of the intrathoracic stomach. The term "massive hernia" is used for those cases in which the greater part of the stomach is in the thorax and, as a result, usually passes over to occupy the right hemithorax or becomes inverted to produce an upside down stomach (Figure I). My own personal series of 200 cases (112 female, 88 male patients) is classified as follows: (i) bell hernia, 86%; (ii) para-oesophageal hernia, 10%; (iii) massive hernia, 4%.

Congenital partial thoracic stomach does occur; but it is extremely rare, it is not a true hernia, and it can be diagnosed with any certainty only at operation, and is therefore not included in the foregoing classification.

#### Anatomy and Aetiology.

There is still considerable difference of opinion and much room for research on the anatomy and physiology of the cardio-oesophageal junction. Lerche (1950) studied a series of 100 cadavers, and produced a description and terminology which will be largely adhered to in this paper, as his work is substantially confirmed by radiology. Lerche describes a gastro-oesophageal segment of expulsion (Figure II) which embraces the constrictor caridæ, the gastro-oesophageal vestibule, the inferior oesophageal sphincter, the phrenic ampulla and the phreno-oesophageal elastic membrane. The oesophagus has but a loose attachment to the hiatus by way of the phreno-oesophageal membrane, which arises from the pillars and fascia of the diaphragm, and then splits into an ascending layer, which is inserted into the oesophagus at the level of the inferior oesophageal sphincter, and a descending layer, which passes downwards over the stomach.

In considering the aetiology, it is necessary to study each type of hernia separately in view of their differing characteristics.

The aetiology of the bell hernia has been the subject of very considerable research and speculation, but still remains in doubt. Harrington was firmly convinced that a defect in the phreno-oesophageal membrane was the main factor in formation of a hernia, and his operative procedures were based to a large extent on restoring the membrane's effectiveness. The significance of the size of the hiatus has also been studied by Harrington, who found, in a series of 1000 laparotomies, that 10% of the patients examined had an abnormally wide hiatus. Belsey (1952) and Donnelly (1953) regard the sharp angle of entry of the oesophagus into the stomach as producing a valve for the prevention of reflux and hernia, and it would seem that this factor is of considerable importance. Johnstone (1955) draws attention to the role of continued reflux with resultant oesophagitis as producing traction from above, and this may well be a factor when it is combined with fibrosis and stricture. Barrett (1954) mentions the importance of the left gastric artery in anchoring the stomach, and he is certainly right in assuming that the artery prevents the bell type of hernia from attaining great size. A lead to the causation of bell hernia may be obtained from the study of the type of patients who develop the condition—heavily built, fat people; in such individuals the stomach is high, and the cardia is also high in relation to the stomach. In persons of average build hiatus hernia of the bell type is quite rare, and in these people the cardia may be quite low and makes a sharp angle with the stomach. The diagram (Figure III) shows how the oesophago-gastric angle can vary with the habitus. The oesophago-gastric angle has a profound influence on the formation of a hernia or of a condition of reflux at the cardia. It is well known that if the stomach and oesophagus are removed from a cadaver and the stomach is filled with water under pressure, the cardia will not allow of reflux up the oesophagus when the oesophago-gastric angle is normal, but if the angle is allowed to approach that in Figure Va, then regurgitation will occur. Further proof of the importance of a normal angle in the prevention of reflux is provided by a study of massive hernia such as that

seen in Figure IV.<sup>1</sup> In this case the whole stomach is intrathoracic, and neither the diaphragm nor the phreno-oesophageal membrane could have any effect at the cardia. However, as the oesophago-gastric angle was normal, there was no reflux, and the symptoms were simply those of a space-occupying thoracic lesion. It is easy to see how reflux can occur in people who have high transverse stomachs, the commencement of the reflux often being due to a period of vomiting or of rapid weight increase, or even to the wearing of tight corsets. Reflux at the cardia having commenced, it does not need traction or suction from above for herniation to follow; it has already been pointed out that attachment at the hiatus is quite loose, and with or without reflux, the vestibule can easily pass up through the hiatus and come to lie in the thorax; the resistance of the phreno-oesophageal membrane will be overcome, and portion of the body of the stomach will follow the vestibule and become anchored in the thorax to produce a bell hernia (Figure V).

Para-oesophageal hernia are often found anterior to the hiatus, and in some cases the cardia may be below the diaphragm. This has led to the belief that the stomach enters a preformed sac just anterior to the hiatus, and the sac may be one of the pneumo-enteric recesses. Right and left recesses are found in the embryo. Hamilton *et alii* (1945), showed that the left recess does not persist, but the right recess very often remains as the infracardiac bursa. It seems highly probable that in some cases the para-oesophageal lesions may arise in this way; but this is certainly not the rule, as in the present series the oesophagus entered the stomach above the diaphragm, showing that the hernia was through the hiatus and not into a separate sac. There seems reason to believe that in cases such as this the hiatus must have been larger than normal, and that this congenital defect was the basis for the occurrence of the hernia.

Massive hernia arise as a later development of para-oesophageal protrusions, the oesophagus generally retaining a normal relationship with the stomach unless rotation takes place to produce an upside-down stomach. The very size of the defect which must be present to produce a massive hernia tends to make one believe that a developmental anomaly of the hiatus is involved; but this still does not explain why, as in other types of hernia, the protrusion into the thorax does not take place until the fifth or sixth decade.

Whilst there is still uncertainty as to the basic defects in the aetiology of hiatus hernia, there can be no doubt as to the two main precipitating factors in its causation. These are age and raised intraabdominal pressure, the typical patient being in the fifth, sixth or seventh decade, of heavy build, and possibly suffering from some other upper abdominal or cardiac disease. Mention must be made of the frequency of associated cholecystitis and duodenal ulcer whilst one case was encountered which demonstrated Saint's triad (quoted by Palmer, 1951, and Muller, 1948), in which hiatus hernia, gallstones and colonic diverticulosis were present. Occasional cases occur in infants (Feldman, 1957); but once the first year is passed, it is unusual to find a hernia in a patient aged under 40 years, with the exception of those cases associated with pregnancy; Rigler and Eneboe (1935) found that in pregnancy the rise in intraabdominal pressure produced hernia in 18% of those examined. This figure seems very high; but is likely to go unchecked for some time, now that it is held that pregnant women should not be subjected to non-essential radiography.

#### Symptomatology.

Pain is the most constant symptom in hiatus hernia. It is usually chest pain, which may be substernal or may pass around the lower half of the left side of the chest, but can also involve the neck and left arm. It is, therefore, not surprising that difficulty arises in the differentiation from cardiac pain, and radiological examination of the upper gastro-intestinal tract should always be considered when a diagnosis of cardiac disease is not

<sup>1</sup> For Figures IV, VIIa, VIIb and VIII see art-paper supplement.

supported by direct evidence of cardiac abnormality. A feeling of fullness in the chest, which may be accompanied by heart-burn or regurgitation of acid fluid into the pharynx, may also be present. Dysphagia is not uncommon in para-oesophageal hernia, whilst dyspnoea may be a feature of massive hernia. Again the symptoms may be those of anaemia, and there may be no other indication of the presence of hernia, especially in para-oesophageal lesions. One further symptom has been found with great frequency in the present series in all types of hernia, and that is belching. The significance of this symptom may easily be overlooked, unless it is realized that it occurs in this condition, and there is therefore a very strong probability that if a heavily built, middle-aged or elderly patient is troubled by frequent belching, he will be found to have a hiatal hernia. Finally, although the symptoms enumerated are those found most frequently, it should be realized that the symptoms can be many and varied, and that it is most necessary to keep the possibility of hernia in mind in any obscure case in which symptoms may suggest chest or upper abdominal disease. It is also worthy of note that Jones (1952)

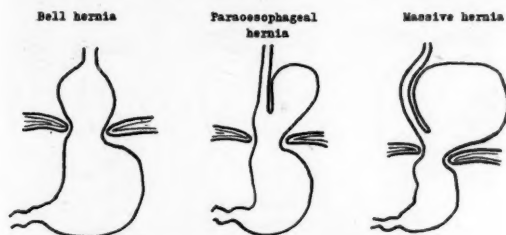


FIGURE I.  
The classification of hiatus hernia.

considers that a very large majority of the cases previously lumped together as nervous dyspepsia are in fact cases of hiatus hernia.

#### Review of Radiological Techniques.

Firstly, the necessity to make a radiological examination with the patient in the horizontal position was foreshadowed by Soresi (1919), and is now accepted; but the following techniques have been put forward by various authorities.

1. Supine position. The use of the supine position has been widely advocated, especially by Shanks (1948) and by Johnstone (1958); but it has the disadvantage of showing up the phrenic ampulla and the gastro-oesophageal vestibule much more clearly than a hernia.

2. Leg raising. This procedure, in which the supine patient is asked to raise his heels off the table whilst keeping the knees straight, has been advocated by Boyd *et alii* (1956). Raising the head from the table may also be substituted, and these authors combine the use of laughing, coughing, sniffing and the Valsalva method to assist in diagnosis.

3. Marchand manoeuvre. A distinct advance in examination for hernia and reflux was made by Marchand (1952), who placed a football bladder over the upper part of the abdomen with the patient supine, and then inflated the bladder under a binder. This method can be very useful, especially in the investigation of strictures of the lower part of the oesophagus; but it has the disadvantage that if the pressure is high enough reflux can be produced in any given patient, and no standard of normality has been arrived at.

4. Prone position. The use of the prone position has been advocated by Ritvo (1951) and by Wolf *et alii* (1956). These techniques seem to be effective; but that of Wolf and his colleague has the disadvantage that the patient is examined with the oesophagus full, and as a result difficulty is likely to be experienced in differentiating hernia from the phrenic ampulla and the vestibule.

#### A Technique of Examination.

The following technique for the demonstration of hiatus hernia has been found to be most effective and to give a reliable impression of any abnormality of the cardio-oesophageal region. It is not claimed that the method used is original in all particulars; but its main virtue is that it is based on a rigid system which has been built up after study of the relative anatomical and physiological background. It is fully realized that thorough examination of the full length of oesophagus and stomach is desirable in any upper abdominal gastro-intestinal series, and no attempt is made to produce an arbitrary separation between oesophagus and stomach, in view of the fact that anatomical demarcation between them, derived as they are from the same tube, is so difficult (Hagarty, 1959a). The terms

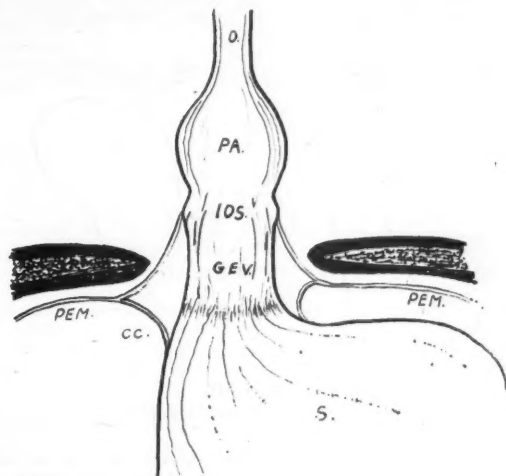


FIGURE II.  
The gastro-oesophageal segment of expulsion  
(after Lerche).

"barium bolus" and "barium meal" are not recognized as limiting factors to the extent of the investigation, which is regarded as commencing at the cricoid and finishing at least as distal as the second part of the duodenum, as no proper appreciation of a hernia at the hiatus can be arrived at without appropriate study of surrounding anatomy. Nevertheless, this point is often not fully appreciated either by clinicians or by radiologists, and search for hernia at the hiatus is sometimes conducted entirely from above with a barium bolus swallow or from below after an opaque meal, with resultant confusion.

The system used consists of examination of the oesophagus, stomach and duodenum, and commences with the patient standing erect and drinking 6 oz. of a mixture of barium and water of watery consistency. The opaque medium is watched passing down the oesophagus, although its progress is usually too fast to allow of any but the most gross lesions to be seen in the erect position. Fluoroscopic examination of the stomach and duodenum is then carried out, with accompanying serial radiography; this includes at least one radiograph of the cardiac end of the stomach in the erect position.

After this, the table is tilted into a horizontal position, and the patient is turned slightly to the left and asked to swallow two or three teaspoonfuls of thick barium mixture. The passage of the barium is watched carefully down the entire length of the oesophagus, the image intensifier being used for the fluoroscopy, and special attention is paid to the lower end of the oesophagus, in order to exclude the presence of diverticula or of any small hernia which may fill at this stage.

Two distinct technical advances in radiography are of very great value in the examination. The first of these



is photo-electric timing, which makes the serial radiography an automatic process and allows pictures to be taken at extremely fast speeds. This helps to make clear various peristaltic processes which may be too quick for the eye to follow. The circuits used in the present series of examinations are based on those described by Morgan (1942, a and b). With photo-electric timing, a series of radiographs are made of the entire length of the oesophagus, and at least one of these is centred over the cardio-oesophageal region. The second technical advance found useful is the image intensifier, which intensifies the brightness of the image on a fluoroscopic screen that is in close contact with a sensitive photo-cathode. The photo-cathode releases electrons proportionate to the brightness of the

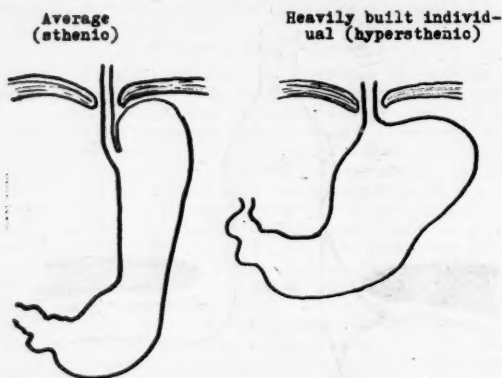


FIGURE III.  
The oesophago-gastric angle.

screen, and these electrons are accelerated by a high voltage and focused on a second screen, the image at this stage being very small but very bright. The image is then magnified by an optical system to normal size, whilst the increase in brightness (which is of the order of up to five hundred times) is retained. This vast increase in brightness advances gastro-intestinal diagnosis in at least two directions. Firstly, most patients who have or are suspected of having hiatus hernia are big, solidly built people, and the ordinary unamplified fluoroscopic image of the regions around the diaphragm is very dim and poorly defined. Image intensification produces a fluoroscopic picture of dramatic clarity and brilliance, thus causing what was previously ill-defined and shadowy to become clear-cut and definite. Secondly, image intensification allows of using much less radiation, the dose per minute being reduced to between one-tenth and one-fifth of the previous standard. Consequently, in doubtful cases investigation can be prolonged, and the dose of radiation received by patient and examiner is still only a fraction of what may be received in standard fluoroscopic techniques. The brightness of the intensified image makes possible the use of a whole range of additional electronic devices, such as cineradiography, teleradiography and "Video"-tape recording. There is tremendous potential for gastro-intestinal diagnosis and research in such techniques, which allow of a physiological approach to the dynamics involved.

At this stage the patient is given approximately 12 oz. of thin barium mixture, and firm manual pressure is exerted over the cardiac end of the stomach in order to exclude any obvious reflux; but this must be done only after a check of the full length of the oesophagus has been made to see that it is empty, as the arrival of small quantities of barium from the upper end of the oesophagus can often give the impression that the opaque medium has passed up from the stomach and a mistaken diagnosis of reflux results.

In the next stage of the prescribed routine, the patient is turned into the prone position and is asked to lie on a transradiant bolster, which is about 12 in. above the

level of the table. The patient lies with the shoulders flattened and the head turned to one side, so that the full weight of the trunk rests on the bolster. This is placed across the upper part of the abdomen in such a way that the intraabdominal pressure is raised whilst the diaphragm is allowed to relax, thus producing the ideal environment for herniation (Figure VI). The alteration in the position of the stomach produced by this manoeuvre is well seen in Figures VIIa and VIIb, which demonstrate how this pelvis-high and head-low technique can be completely effective without any tilting of the table. With the head placed in the position described and with the oesophagus known to be previously empty, the cardio-oesophageal area is then carefully examined with the image intensifier, and appropriate serial radiographs are taken.

Should reflux take place, it will be clearly demonstrated on the intensifier screen and can be recorded on serial radiographs, and similarly herniation will be clearly demonstrated and can be recorded radiographically. Should

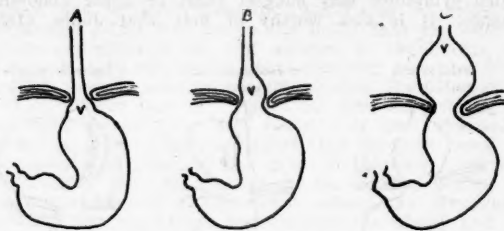


FIGURE V.  
Stages in development of a bell hernia.

neither hernia nor reflux be apparent, the patient is rocked firmly from side to side on the bolster to eliminate any possibility of valve effect at the cardia. If the results are still negative after this further manoeuvre, the subject may be re-examined at the end of a few hours, after which the examination can be regarded as being complete.

The routine described above may give the impression of considerable complexity; but despite this, it can be carried out in 15 minutes, including full duodenal and gastric study, if proper use is made of serial radiography, photo-electric timing and image intensification.

#### Interpretation of Radiographic Findings.

As has been pointed out above, most diagnostic errors of the past with regard to the hiatus were those of omission; but of recent years confusion has arisen as to the true nature of small protuberances at the cardia, causing the radiographic method to lose much of its accuracy and authority. Most of the difficulty arises with regard to direct bell hernia and their differentiation from the gastro-oesophageal vestibule and the phrenic ampulla. The greatest difficulty is in dealing with the vestibule, which is that part of the stomach which usually enlarges to produce portion of a direct hernia, and the difficulty is increased because the vestibule is normally placed around the level of the hiatus. As is shown in Figure II the gastro-oesophageal vestibule represents a projection of the stomach upward to join the oesophagus. In older persons there is no doubt that the vestibule may be quite prominent (Figure VIII), and consequently it is only too easy to regard a prominent vestibule as a hernia. Johnstone to some extent overcomes this difficulty by postulating that no lesion should be diagnosed as a hernia unless associated reflux is present; but this dictum is not always sufficient, as it is well known that reflux can take place without herniation, and there is no reason to believe that herniation may not be present without reflux. In dealing with presumed direct bell hernia, therefore, if the projection as measured on prone oblique radiographs is more than 1 in. above the cardia it is regarded as a hernia whether reflux takes place or not, whilst if the projection is less than 1 in. the projection is merely a prominent vestibule (Figure VIII) and the



diagnosis is not influenced by the presence or absence of reflux. It should be emphasized here that the term reflux is meant to indicate the passage of fluid from stomach to oesophagus, and that this term should not be used to describe a transfer of fluid from the abdominal portion of the stomach into the herniated thoracic portion. A further difficulty in diagnosis may be encountered in cases in which free reflux takes place into the oesophagus, after which dilatation is seen just above the diaphragm, the observer being uncertain as to whether the dilatation is a hernia or a phrenic ampulla. If the oesophagus is empty during the search for hernia, the presence of reflux

for the radiologist to recognize in early stages, but which presents a dramatic picture when seen through the oesophagoscope. Endoscopy may also be valuable in the study of strictures and in differentiating ulcer from carcinoma in the thoracic stomach, although the oesophagoscope is at a disadvantage in the study of a large hernia, and the gastroscope can then be used. There is no indication for examining every patient who has an hiatus hernia (Benedict, (1958); but good reasons exist for investigating the oesophagus when hernia is known or suspected to be present, and when there is active bleeding from the alimentary tract (Paulson, 1958). Endoscopy cannot become a substitute for radiography because oesophagoscopy is more difficult and may require an anaesthetic, in addition to which it is not without morbidity and mortality and cannot demonstrate the dynamic processes at the cardia as can properly controlled radiography. Dagardi *et alii* (1958), reporting the endoscopic findings in 107 cases of hiatus hernia, stress the importance of the mucosal study, and sum the position up very fairly when they state that endoscopy is valuable as an "adjunctive procedure" to radiography.

#### Discussion.

Hiatus hernia is by no means a new disease. It was recognized hundreds of years ago, but it is probably unique in the great interest which it has aroused in recent years. However, owing to the way in which the development of knowledge has progressed, we have been left with many different terminologies and theories, some of them misleading to such an extent that even those who are experts in the subject may not, as Barrett (1954) points out, understand what the other parties are talking about. Therefore, let it be said in answer to the question "what is hiatus hernia?" that the common type of hiatus hernia is a bell hernia, which usually occurs in heavily-built, middle-aged patients who have an abnormal oesophago-gastric angle, and that the less common varieties are para-oesophageal and massive hernia, which also occur in middle age, but which are not so frequently found in heavily-built people as the bell hernia. Hiatus hernia represents an abnormal protrusion of the stomach into the thorax through the hiatus, and it may or may not be accompanied by oesophageal reflux. It should also be made very clear that it is not the phrenic ampulla and that it is not the gastro-oesophageal vestibule, both of them normal dilatations around the level of the hiatus. To clear up some further misconceptions, it can be stated that most bell hernia do not slide, that the oesophagus is rarely short, and that the condition is not congenital, so that the expression "sliding hernia with congenital short oesophagus" is one which has outlived its usefulness.

#### Summary.

The increasing frequency of the diagnosis of hiatus hernia is discussed, and the necessity for accurate diagnosis and clearer understanding of the pathogenesis is emphasized. Previous work is reviewed, and a simplified classification is put forward which, it is hoped, avoids any misleading implications. Some radiographic techniques of examination are reviewed and a method of examination is elaborated in which the rigid criteria adopted allow of accurate diagnosis. Further mention is made of the value of the image intensifier in the diagnosis of these lesions, it being held that this technical advance will eventually prove to be of great benefit in many fields of gastro-enterology, especially when it can also be combined with cinematography and the newer "Video" techniques. The role of endoscopy in relation to the diagnosis of hernia is discussed, and finally the question "what is hiatus hernia?" is dealt with.

#### Acknowledgements.

I wish to thank Miss M. Rolleston, of the Library of the New South Wales Branch of the British Medical Association, for considerable assistance with references. The diagrams were drawn by Mr. P. Juul, and the photographs of skiagrams were made by the Medical Illustration

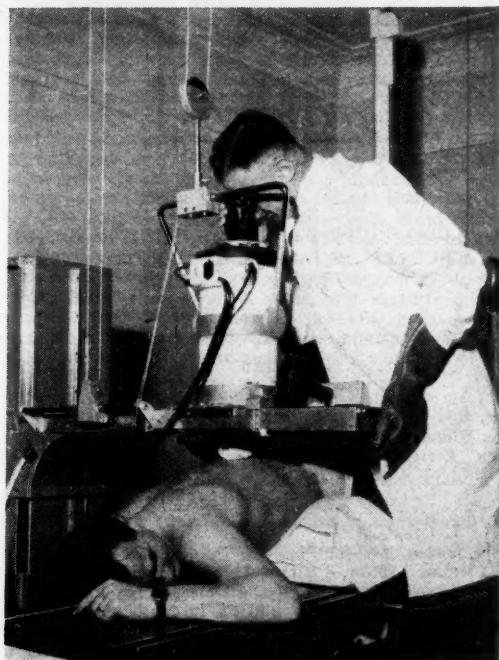


FIGURE VI.

The patient lies prone on the X-ray table positioned so as to allow demonstration of a hernia.

is the only factor which can cause difficulty in the differentiation from the ampulla. In these cases the problem is due to the filling of the oesophagus from below; but so long as this is recognized the diagnosis should not be difficult, as the ampulla undergoes a characteristic cycle on inspiration, and its behaviour is quite distinct from that of a hernia (Hagarty, 1959b).

Para-oesophageal hernia rarely create difficulty in diagnosis; but the very occasional one which may fail to fill can usually be recognized by consequent displacement of pulmonary vascular markings and of the oesophagus on its medial side. Massive hernia always fill in the horizontal position and should create no difficulty for the observer. It is, therefore, most unlikely that an hiatus hernia can escape detection if the routine described is followed and it is equally unlikely that a normal structure such as the vestibule or the ampulla will be confused with hernia.

#### Endoscopy.

Important contributions in the application of endoscopy to the study of hernia have been made by Benedict (1951), by Clerf *et alii* (1950), by Moersch (1938), by Palmer (1949) and by Schindler (1950). The instrumental study of these cases is of special value in the demonstration of oesophagitis—a pathological condition which is difficult

Department of St. Vincent's Hospital, Sydney, with the cooperation of Mr. K. Nelson. I also wish to thank Mr. N. Hodsdon and Mr. F. Quealey for their radiographic work.

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#### Legends to Illustrations.

FIGURE IV.—Skiagram showing massive hiatus hernia which has rotated into the right hemithorax. Note the normal oesophago-gastric angle.

FIGURE VII.—Skiagrams of patient with normal stomach: A, standard prone position; B, position described for demonstration of hernia, showing distension of cardiac end of stomach.

FIGURE VIII.—Skiagram showing prominent vestibule in an elderly patient.

### A BLOOD GROUP GENETICAL STUDY MADE IN A SURVEY OF ILLNESS IN MONOZYGOTIC AND DIZYGOTIC TWINS.

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IN a series of recent papers, Doig (1957, a, b, c), Doig and Pitman (1957), Pitman (1958), and Jones and Doig (1958) reported a study of the illnesses revealed in twins in a general hospital population in Melbourne. In those studies, zygosity was determined by means of the blood groups A<sub>1</sub>A<sub>2</sub>BO, MNS, Rh, P, Duffy (Fy<sup>a</sup>), Kell (K) and Lewis (Le<sup>a</sup>), and by AB secretor status and data on physical features.

The present paper reports and discusses the blood-group findings in those investigations. Samples for blood grouping were obtained from 246 index twins (the index twin being the member of the twin pair first examined); but for various reasons elaborated by Doig and Pitman (*loc. citato*) samples were obtained from only 103 co-twins.

#### Materials and Methods.

The samples for blood grouping were collected into glucose-citrate solution, and the methods employed for testing were those described by Simmons, Graydon, Semple and Taylor (1951).

#### Results and Discussion.

The results of all the blood-grouping tests are presented in Table I, which gives the numbers and, where appropriate, the percentage of twins in each blood group of the several systems. The calculated gene frequencies are also given.

In the 103 twin pairs tested there were 33 pairs of identical twins, 14 male and 19 female, all of whom showed the expected complete agreement in their blood groups.

There were 25 twin pairs of unlike sex, which is less than the 35% quoted by Race and Sanger (1958) for Europeans. In a series of 172 new-born twin pairs tested for ABO and Rh blood groups by one of us (R.J.), there

<sup>1</sup> One of us (R.K.D.) was aided by a grant from the Nuffield Foundation.

were 61 (35.5%) of unlike sex. The lower figure in the general hospital series, as explained later, may be a reflection of bias towards monozygosity in that type of series. No such bias is possible in the series of new-born twins. However, the ratio of monozygotic to dizygotic pairs in our series when both members were seen was 33 to 70 (0.47), which does not differ significantly from the 29 to 67 (0.43) found by Walsh and Kooptzoff (1955) in 96 pairs of baby twins.

Of those pairs in which the index twin only was seen, the monozygotic to dizygotic ratio was 20 to 123 (0.16), which is significantly different from that for pairs both members of which were tested. This was possibly the result of the greater tendency of monozygotic twins to remain close together in life, which would make the locating of the co-twin easier for monozygotic than dizygotic pairs. Thus one might expect a higher ratio of monozygotic to dizygotic twins in the group comprising twins both of whom were seen, than in the group in which only one member of each twin pair was seen. It would appear that there is a similar tendency for twins of like sex, even though dizygotic, to remain closer together during life than twins of unlike sex. This could explain the significantly high ratio of 90 to 50 in same to opposite sex, in the pairs of dizygotic twins who were both seen in the present series. In Walsh and Kooptzoff's series of new-born twins there was a significant departure from expectation in the distribution of the ABO blood groups, which the authors ascribed to a surplus of Group AB. As this could not be explained on the basis of poorly-

developed or weakly-reacting antigens, it was thought advisable to examine for similar trends the present general hospital series and also the previously referred to newly-born twin series of Jakobowicz. In neither case was there any significant departure from expectation, nor was there a surplus of Group AB.

The ratio  $A_1$  to  $A_2$  (3.0) in the adult series was typical for a European population, and very different from the apparent 50:50 proportion in the new-born (Walsh and Kooptzoff, 1955, and others).

Walsh and Kooptzoff also reported a significant excess of type Rh,Rh<sub>1</sub> (CDe/cDE) in their series. As with the excess of Group AB, this could hardly be ascribed to poorly-developed antigens, so that it is interesting to observe that there was no such excess in the present adult series, nor was there any significant departure from expected frequencies. Walsh and Kooptzoff point out that false positive reactions with anti-rh" (E) may have been the cause of some of the unexpected excess in type Rh,Rh<sub>1</sub> in their series.

The distribution of blood groups in the twins of the present series (Table I) does not differ significantly from that in the general Australian population based on comparisons with previously published gene frequency data: ABO (Bryce, Jakobowicz, McArthur and Penrose, 1950-1951); MNS and P (Simmons and Graydon, 1950); Rh (Simmons, Jakobowicz and Kelsall, 1945); Le<sup>a</sup> (Simmons and Jakobowicz, 1951); and Fy<sup>a</sup> and K (Simmons, Graydon and Semple, 1953). Hence there was nothing to suggest that twinning was linked with any

TABLE I.  
Blood Group Frequencies of Twins in a General Hospital Population.

Blood Groups.	Both Twins Seen.			Index Twin only Seen.			Out-Patients.		Total Persons.	Gene Frequencies.
	Identical.	Non-Identical.		Identical.	Non-Identical.		Identical.	Non-Identical.		
		Same Sex.	Opposite Sex.		Same Sex.	Opposite Sex.				
O .. ..	32	46	19	3	21	30	2	7	160 (45.8%)	$A_1 = 0.1936$
A <sub>1</sub> .. ..	22	25	20	6	15	19	3	5	116 (33.0%)	$A_2 = 0.0648$
A <sub>2</sub> .. ..	4	12	4	2	4	3	—	2	31 (8.9%)	$B = 0.0636$
B .. ..	8	4	5	4	3	6	—	2	32 (9.2%)	$O = 0.0780$
A <sub>1</sub> B .. ..	—	3	2	—	—	2	—	—	7 (2.0%)	
A <sub>2</sub> B .. ..	—	—	—	—	2	—	—	2	4 (1.1%)	$A_1/A_2 = 3.0$
Total ..	66	90	50	15	45	60	5	18	349	
MMS .. ..	16	13	7	3	5	9	1	5	50 (16.9%)	$MS = 0.2249$
NNS .. ..	4	8	7	1	2	3	—	1	26 (7.4%)	$M_s = 0.2980$
MNS .. ..	20	38	16	4	15	14	1	3	106 (30.4%)	$NS = 0.1019$
MMas .. ..	6	7	8	—	1	9	—	—	31 (8.9%)	$N_s = 0.3752$
MNas .. ..	4	15	4	1	9	12	2	1	48 (13.8%)	
MNss .. ..	6	14	8	6	13	13	1	8	79 (22.6%)	
Total ..	66	90	50	15	45	60	5	18	349	
Rh <sub>1</sub> Rh <sub>1</sub> ..	14	14	13	2	8	6	1	2	60 (17.2%)	$R^*(cDe) = 0.0482$
Rh <sub>1</sub> rh ..	14	31	12	3	17	30	1	5	113 (32.4%)	$R^*(CDe) = 0.4078$
Rh <sub>1</sub> Rh <sub>2</sub> ..	12	16	7	2	6	8	1	5	57 (16.3%)	$R^*(cDE) = 0.1788$
Rh <sub>1</sub> Rh <sub>2</sub> ..	—	—	—	—	—	—	—	1	1 (0.3%)	$r^{(cde)} = 0.3501$
Rh <sub>1</sub> rh ..	—	1	—	—	—	—	—	—	1 (0.3%)	$r^{(Cde)} = 0.0119$
Rh <sub>2</sub> .. ..	10	15	8	6	7	6	—	3	55 (15.8%)	$r^{(cDE)} = 0.0081$
Rh <sub>2</sub> .. ..	4	2	1	—	1	3	—	2	13 (3.7%)	
rh .. ..	12	10	8	1	5	7	1	—	44 (12.6%)	
rh'rh ..	—	1	1	—	—	—	1	—	3 (0.9%)	
rh' .. ..	—	—	—	1	1	—	—	—	2 (0.6%)	
Total ..	66	90	50	15	45	60	5	18	349	
rh <sup>w</sup> .. ..	2	2	1	—	—	—	1	—	6 (1.7%)	
Total ..	66	90	50	15	45	60	5	18	349	
P .. ..	54	75	36	11	37	50	4	15	282 (81.3%)	$P_1 = 0.5672$
Total ..	64	90	50	15	45	60	5	18	347	$P_2 = 0.4328$
Le <sup>a</sup> .. ..	8	17	24	3	5	14	—	4	75 (24.7%)	
Total ..	60	76	44	14	37	52	3	18	304	
Fy <sup>a</sup> .. ..	36	56	41	11	29	38	2	12	225 (64.5%)	$Fy^a = 0.5961$
Total ..	66	90	50	15	45	60	5	18	349	$Fy^b = 0.4039$
K .. ..	8	10	8	2	4	7	2	2	43 (12.4%)	$K = 0.0640$
Total ..	64	90	50	15	45	60	5	18	347	$k = 0.9360$



of the blood-group systems examined. Also, with one exception, the distribution of types within each system did not differ significantly between monozygotic and dizygotic twins. However, there was a significantly higher proportion of Le(a+) in dizygotic twins in the series. There were only four pairs of Le(a+) twins in 30 monozygotic pairs, compared with 41 Le(a+) individuals among 120 dizygotic twins (60 pairs). There was a similar significant difference between the Le(a+) distribution between twins of like and unlike sex, the higher frequency being observed in those of unlike sex. The Le<sup>a</sup> tests and secretor determinations were performed in independent laboratories, and not every twin was tested. A regular check on the results showed that Le(a-) individuals of Groups A, B and AB in all instances were A or B secretors, and Le(a+) individuals were non-secretors. Group O individuals were not tested for secretion of H substance, as no suitable testing reagent was available at the time. We can offer no explanation of the apparent partial association between Le(a+) and zygosity and sex difference in twin pairs, and although more extensive tests may prove it to be merely a chance variation, it is interesting to observe that the unexpected result relates to the incompletely understood Lewis system, which influences, or is influenced by, both ABH and Lewis salivary secretion.

The effectiveness of each of the blood-group systems used in this survey in discriminating between non-identical twin pairs is shown in Tables II and III, Table II showing the results of individual pairs and Table III the summarized results and percentage discrimination.

The series shows very good agreement with the expected values for percentage discrimination for the Australian population calculated according to the method of Smith and Penrose (1955).

Discrimination by the A<sub>1</sub>A<sub>2</sub> subgroups occurred on three occasions in the series, and in each of these it was supported by differences in other blood-group systems.

Of the 70 non-identical pairs, 45 were of like sex (24 male and 21 female pairs) and 25 were of unlike sex.

Two non-identical pairs of like sex were not differentiated by their blood groups, which were as follows: male pair, O, MNss, Rh<sub>0</sub>, P<sub>+</sub>, Le(a+), Fy(a+), K-; female pair, A<sub>1</sub>, MNS, Rh<sub>0</sub>, P<sub>+</sub>, Fy(a+), K-. There was also one pair

of unlike sex not differentiated by blood groups, which reacted as follows: O, Mss, Rh<sub>0</sub>, P<sub>+</sub>, Fy(a+), K-. These three twin pairs have been indicated in Table II by asterisks.

The probability of such failure of blood groups to detect dizygosity depends on the actual blood groups found, and their frequencies in the general population from which the sample has been drawn. In the present instances these probabilities calculated by means of the method of Smith and Penrose (*loci citati*) were 0.052, 0.114 and 0.099 respectively. These values do not suggest any significant departure from expectancy.

Osborne and De George (1957) reported selection in dizygotic twins by which there were more ABO concordant dizygotic twins than would be expected from the ABO frequencies in the population. They found 70% ABO concordant pairs in adult dizygotic twins and 91% in juveniles. In the Australian white population one would expect 63% of all dizygotic twins to be concordant with respect to their ABO blood groups, and in the present series 60% were found. This does not confirm Osborne and De George's report. Race and Sanger (1958) reported that in England one would expect 66% of dizygotic twins to be concordant in respect to their ABO groups, whereas 62% were observed in 77 pairs examined.

Osborne and De George also refer to a possible association between the above-mentioned selective mechanism and maternal age and parity. In the absence of evidence for such selection in both the English and Australian series, an association with maternal age and parity could not be confirmed.

Osborne (1958) refers to serious discrepancies in the results of blood-group determinations carried out by professional technicians in the United States of America on samples of clotted blood less than 24 hours old. Grossly unreliable reactions were disclosed by repeated tests carried out on the same samples in different laboratories. He states that in these tests the errors revealed in respect to various blood factors were P (50% error), S (22.8%), Le<sup>a</sup> (20%), Kell (12%), Duffy (12.5%), MN (9.2%), c (1.9%), E (1.6%), D (0%), C (0%) and ABO (1.64%). As the result of a successful trial under field conditions, he suggests the use of ACD or Alsever's solution with added streptomycin and "Terramycin" as a preservative for cells to be used for blood-group determinations.

TABLE II.  
Concordance or Discordance in Blood Groups of 70 Non-Identical Twin Pairs.<sup>1</sup>

Rh Status.	MNS Status.	Factor.	Like Sex. <sup>2</sup>		Unlike Sex. <sup>2</sup>		Total.	
			A-B-O Like.	A-B-O Unlike.	A-B-O Like.	A-B-O Unlike.	Alike.	Unlike.
Alike.	Alike.	C <sup>w</sup>	AAAAAA	A	AAAAAA	AA	15	—
		P	UUUUUA	U	UUUUUA	AA	8	7
		Le <sup>a</sup>	AAAAU	A	U.AUUU	A	7	5
		Fy <sup>a</sup>	UUUUUA	U	UUUUUA	AU	7	8
Alike.	Unlike.	K	AAAAAA	A	AAAAAA	AA	15	—
		C <sup>w</sup>	AAAAAA	AAA	AAAA	AAA	16	—
		P	AAAAUA	UAU	AAUA	AAA	12	4
		Le <sup>a</sup>	AAAAAA	U	AAUA	A.U	9	4
Unlike.	Alike.	Fy <sup>a</sup>	UUUUUA	AUU	AAAA	AAA	13	3
		K	AAAAAA	AAU	UAAA	AAA	14	2
	Unlike.	C <sup>w</sup>	AAAUAAAA	UAAAAA	A	AAA	17	2
		P	AAAAAAUA	AAAUUA	A	AAA	16	3
Unlike.	Alike.	Le <sup>a</sup>	UAA.AUUUA	AAAA.U	A	U.A	11	5
		Fy <sup>a</sup>	AAAUUUUA	AAAUUA	A	AUU	12	7
		K	AAAUAAAA	AAAAUU	U	AAU	13	6
Unlike.	Unlike.	C <sup>w</sup>	AAAAAA	AAAAAA	UAAA	AA	19	1
		P	AAAUUA	AAUUAAAA	AAUA	AU	16	4
		Le <sup>a</sup>	UU.AAA	AAAAAA..	AAA	AU	13	3
		Fy <sup>a</sup>	AAAAUA	AAAAUAUA	AAAU	UA	15	5
Totals		K	AAAAAA	AAAAAA	AAAA	AU	18	2
			27	18	15	10	70 pairs	

<sup>1</sup> The reactions of each twin pair are represented as a single column in the appropriate cell.

<sup>2</sup> A = concordance with respect to blood factor in third column; U = discordance with respect to blood factor in third column. The three non-identical twin pairs which were not differentiated by any of the blood-group systems are indicated by asterisks.

Two of us (R.T.S. and J.J.G.) have used a modified Rous and Turner (glucose-citrate) solution for erythrocyte preservation in all Pacific racial and other blood studies for the past 20 years with considerable success. Sterile erythrocyte suspensions stored at 5°C. have been fully grouped through all the major blood-group systems after storage for periods up to 30 months. Blood transported in glucose-citrate solution has always been regarded here as vastly superior to aged cells from the clot in blood-group determinations. However, it should be understood that it is not our experience that clotted blood less than 24 hours old is apt to give unreliable blood-grouping results as suggested by Osborne. Variation in the blood-grouping results reported by him was more likely due to the quality of the testing reagents available for the various blood-group systems tested.

#### Human Blood-Group Chimeras.

Owen (1945) drew attention to anastomoses usually present between dissimilar bovine twin embryos, wherein primordial erythrocytes belonging to one twin take root

TABLE III.

Discrimination of 70 Non-Identical Twin Pairs by Sex and Blood Groups.

Factor.	Number which Appear Alike.	Number which Appear Unlike.	Percentage Discriminated.
Sex	45	25	36
A-B-O	42	28	40
M-N-S	34	36	51
Rh	31	39	56
rh <sup>w</sup>	67	3	4
P	52	18	26
Le <sup>a</sup>	40	17	30
Fy <sup>a</sup>	47	23	33
K	60	10	14

in the other and produce erythrocytes with foreign antigens throughout the life of the animal. A chimera condition was found in a human twin and reported by Dunsford, Bowley, Hutchinson, Thompson, Sanger and Race (1953), and other rare examples found have been discussed by Race and Sanger (1958). All blood-group agglutination tests performed in the present study were examined carefully for evidence of both agglutinated and unagglutinated erythrocytes in a search amongst the twins for such chimeras. In some instances weakly agglutinated cells or some unagglutinated cells in blood groups other than ABO were observed, but a check with the hospital revealed on each occasion that the patient had received emergency transfusions without the fact being disclosed to those workers engaged in the present serological study. Such observations are not unusual after blood transfusions, indicating, for example, type M cells in a type N person, P-positive cells in a P-negative person, and so on. Because a number of blood antigens rarely give rise to antibody production or have a natural corresponding antibody in the blood, they are seldom detected in compatibility testing, which explains why, for example, a type N individual may have type M cells circulating in his blood for a period after a transfusion, and such cells may be detected in MN blood-grouping tests of a suitable nature. In the present study no chimera was discovered, which adds further evidence supporting the rarity of this state in human twins compared with bovine twins. However, a sensitive technique, such as that described by Jones and Silver (1958) for the detection of minor erythrocyte populations, may reveal that human chimeras are more common than present tests indicate.

#### Anti-A and Anti-B Serum Titres.

These were determined in a number of instances, but not in all monozygotic and dizygotic twins. The results suggest that the titres in identical twins may be more nearly alike than in fraternal twins, but the data were insufficient to be certain on this point.

#### Summary.

In a study of twins in a general hospital population, zygosity was determined by means of the blood groups A<sub>2</sub>BO, MNS, Rh, P, Duffy (Fy<sup>a</sup>), Kell (K) and Lewis (Le<sup>a</sup>), by AB secretor status and by data on physical features.

Samples for blood grouping were obtained from 246 index twins, but for various reasons blood samples were obtained from only 103 co-twins.

The results of the blood-group studies are presented, and the findings are discussed in relation to data of other twin studies. The distribution of the blood groups in the twins does not differ significantly from that in the general population. The distribution of types within each system did not differ significantly between monozygotic and dizygotic twins except for the blood group Le<sup>a</sup>.

The effectiveness of each blood-group system in the present survey in discriminating between non-identical twin pairs is given as percentage discrimination. There is good agreement between the expected discrimination and that found.

No example of human blood-group chimera was discovered in the series of twins tested.

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# PROLONGED CHEMOTHERAPY FOR PULMONARY TUBERCULOSIS: A FOLLOW-UP STUDY.

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In recent years it has been demonstrated beyond doubt, and notably in the series of trials conducted by special committees of the Medical Research Council of Great Britain, that anti-tuberculous chemotherapy, together with surgery in appropriate cases, provides specific and effective treatment for pulmonary tuberculosis; and it has further been shown that it is necessary to give anti-tuberculous drugs for a prolonged period, if recrudescence of the disease is to be prevented. There remain, however, a number of important problems in the treatment of pulmonary tuberculosis, about which agreement has not been reached. Thus, opinions differ as to whether prolonged chemotherapy alone is an adequate form of treatment for patients with certain types of non-cavitated residual lesions (Campbell, 1954). Raleigh (1957), in contrast, advocates surgery when cavitation remains present after six to eight months' chemotherapy, although doubt has been expressed about the necessity for surgery for cavitated disease, when the bacteriological findings in the sputum or gastric contents become and remain negative (Douglas and Horne, 1956; Wilson, Doyle and Gardiner, 1958). Again, while opinions have been expressed on the question of the minimum safe duration of chemotherapy (Ross, Horne, Grant and Crofton, 1953; Heaf and Rusby, 1959), the optimum time has yet to be determined.

This paper, which attempts to deal with these questions, is a report of the progress of a group of patients who (i) had had a period of continuous in-patient treatment for pulmonary tuberculosis, and were discharged from Kenmore Repatriation Sanatorium at the end of this stage of treatment, in the year 1956, (ii) had not had any previous treatment for tuberculosis and (iii) had been followed up as out-patients for not less than two years after their discharge from the sanatorium. Sixty-three patients fulfilled these criteria, and all have been included in the series, the follow-up being complete. (While the study is small, it is hoped that it will be extended annually.) Prolonged chemotherapy had been prescribed for all patients. Surgery had been advised only when cavitation was believed to remain present after at least six months' chemotherapy, but was not used in all such cases.

It was thought that a review of all these patients, carried out two years or more after their discharge from the sanatorium would give some indication as to whether this conservative use of surgery, combined with prolonged chemotherapy, is likely to be followed by an excessive relapse rate amongst those with non-cavitated lesions; while the present position of those patients treated medically, and discharged with negative bacteriological findings but with persistent cavitation, should indicate whether the retention of a cavity after long-term chemotherapy carried any hazard.

## Material.

Most ex-servicemen and women in Queensland and northern New South Wales found to be suffering from tuberculosis are admitted to the Repatriation General Hospital, Brisbane, for the initial stages of their treatment. From this hospital, males only are transferred for continuation of treatment to the Repatriation Sanatorium at Kenmore. This unit comprises 74 beds, with radiological and laboratory facilities, and is situated in hilly country 10 miles south-west of Brisbane. From here, patients are discharged to their own homes. Their

further treatment is supervised at the chest department of the Repatriation Out-Patient Clinic at Windsor, or at country centres such as Rockhampton, Townsville and Cairns, clinical reports and radiographs from these centres being sent to the Department's specialist in chest disease in Brisbane.

Sixty-three patients have been studied. The youngest was aged 28 years and the oldest was aged 71 years. When admitted to in-patient treatment, 57 had acid-fast bacilli in their sputum, and 45 had cavitation.

TABLE I

Age in Years.	Number of Patients.
Up to 20 .. ..	0
21 to 30 .. ..	1
31 to 40 .. ..	11
41 to 50 .. ..	22
51 to 60 .. ..	13
61 to 70 .. ..	14
71 and over .. ..	2
Total .. ..	63

## Treatment.

In-patient treatment included a modified bed rest and sanatorium régime. One of the following drug combinations was employed in each case: (i) The daily administration of streptomycin (1 gramme) with sodium PAS (16 grammes) and INAH (300 mg.). (ii) The daily administration of streptomycin (1 gramme) with PAS or INAH. (iii) For patients aged over 50 years, intermittent treatment with streptomycin (1 gramme), or the daily administration of streptomycin (0.5 gramme), with PAS and/or INAH. (When the treatment of these patients was commenced, it was not appreciated that a low dosage of streptomycin with PAS or INAH is risky chemotherapy.) (iv) Sodium PAS (16 grammes per day) and INAH (300 mg. per day).

Sensitivity tests were not done as a routine.

In a few patients over the age of 40 years streptomycin had to be discontinued because of ototoxicity; in no case did any permanent disability ensue. PAS in the form of sodium PAS tablets of 0.5 gramme occasionally caused nausea, bloating, vomiting or diarrhea; in the majority of cases these effects settled down with or without the use of milk and alkalis, while in the remainder, a change to calcium B-PAS (1.0 gramme cachets) ameliorated these side effects. INAH caused little or no trouble.

Surgery was considered only after a trial of at least six months' chemotherapy, and then only if cavitation had persisted after this trial period.

Ten patients with persistent cavitation were operated on. Resection, thoracoplasty and leucite ball plombage were the only operations used. In one of these cases, plombage failed to effect closure of the cavity.

One patient was treated successfully with bilateral artificial pneumothorax.

## Condition upon Discharge from Sanatorium.

The condition of the patients on their discharge from sanatorium is set out in Table II.

In comparison with the condition on admission, it will be noted that cavity closure was achieved in 32 of 45 patients, in nine with the aid of surgery; leucite ball plombage failed to close a cavity in one case, to be described below. There was failure to convert the sputum findings from positive to negative in four cases. One of these patients, without demonstrable cavitation, had a growth of only one colony on his last culture prior to discharge from hospital, one took his own discharge prematurely against advice, and the other two were discharged prematurely for disciplinary reasons.



### Out-Patient Treatment after Discharge from Sanatorium.

It was planned to continue out-patient chemotherapy for at least one year after the patient's discharge from hospital, and for longer if thought necessary. This was done in most cases. In all but one case the full duration of chemotherapy was 16 months or more, and 16 patients were still continuing drug therapy after two years. In 58 cases, PAS and INAH were used for out-patient therapy.

### Condition Two Years after Discharge from Sanatorium.

During the two-year follow-up period, the bacteriological findings in the sputum of two of the four patients, positive on their discharge, reverted to negative; of the other two, one died, and the other continued to have active disease. Radiological or bacteriological evidence of tuberculous activity was found in another six cases. Notes of the one fatal and seven active cases follow.

CASE 61.—The patient, aged 70 years, was found to have tuberculosis in 1952, but declined to have any treatment until 1956, when he was admitted with far advanced disease. He took his own discharge, but died soon afterwards of tuberculous bronchopneumonia.

TABLE II.

Number of Patients.	Cavitation.	Bacteriological Findings in the Sputum.
49 (9) <sup>1</sup>	Not present. <sup>2</sup>	Negative.
10 (1)	Present.	Negative.
1	Not present.	Positive.
3	Present.	Positive.

<sup>1</sup> The figure in parentheses is the number of patients operated on.

<sup>2</sup> Cavitation was never observed, or cavities, originally present, closed.

CASE 18.—The patient was aged 42 years. A cavity persisted after leucite ball plombage; the sputum findings had converted to and remained negative. He was readmitted for segmental resection, which was complicated by a broncho-pneural fistula and empyema. A thoracoplasty has so far failed to deal with this situation.

CASE 22.—The patient was aged 43 years. An uncooperative alcoholic, he was discharged without cavitation, with negative sputum findings. He admitted to laxity about his out-patient drug therapy. He developed a non-specific empyema, and later an extension of his tuberculosis, for which he is again receiving chemotherapy in hospital.

CASE 41.—The patient was aged 35 years. A country man, his sputum findings became positive two and a half years after his discharge, and he is to be readmitted for full review.

CASE 49.—This patient, aged 62 years, another alcoholic, was discharged with cavitation and positive sputum findings, and remains in that state.

In the following three cases, the disease has again been brought under control.

CASE 47.—The patient, aged 45 years, was discharged from the sanatorium for disciplinary reasons, with both cavitation and positive sputum findings. There was radiological evidence of activity one year after his discharge, but the new nodule faded, the cavity closed, and the sputum findings converted to negative.

CASE 56.—The patient was aged 68 years. After his discharge from the sanatorium with negative findings in the sputum and doubtful cavitation, he was seriously injured in a road accident, and during his orthopaedic treatment stopped chemotherapy for four months. The cavitation became more obvious, but closure was achieved, and his sputum remained free from tubercle bacilli.

CASE 57.—The patient, aged 63 years, was discharged from the sanatorium with negative sputum findings and without cavitation. A bachelor, he took very poor care of himself, and his sputum was found to contain tubercle bacilli 21 months after his discharge. He was readmitted and gained weight, and his sputum once more became free of tubercle bacilli.

In terms of the patients' condition on their discharge from the sanatorium, it is seen that the best results were obtained by those patients discharged without cavitation and with negative bacteriological findings. Of 49 patients in this category, nine had been subjected to surgery, and none of these has shown tuberculous activity. Of the remaining 40 patients, three have shown evidence of activity; it was transient in one (Case 57, above), but is still present in Cases 22 and 41.

Of 10 patients discharged with definite or probable cavitation, but negative bacteriological findings, two have had evidence of fresh activity. In one this was transient (Case 56 above), while the other, the patient with surgical complications (Case 18), is still an in-patient, though not with active tuberculosis.

The patient discharged with positive bacteriological findings (a single colony on culture), but without cavitation, has inactive disease.

Of three patients discharged with cavitation and positive bacteriological findings, one (Case 49) has continued to have active disease, another (Case 47) now has inactive disease, and the third (Case 61) is dead.

Of the 13 patients discharged with cavitation, one is dead, in five the cavities are no longer visible, and only one (Case 49) has positive sputum findings.

### Discussion.

The overall relapse rate during the first two years after discharge from the sanatorium compares favourably with the much higher relapse rate experienced prior to the use of prolonged chemotherapy (Sellers and Livingstone, 1952; Medical Research Council, 1948). A favourable comparison can also be made with the results of Raleigh (1957), who used a shorter average duration of prolonged multiple drug therapy.

Although a longer period of observation is desirable, the results have so far justified the practice of treating conservatively patients without cavitation and patients with solid residual lesions. Of the three patients with "closed" lesions who relapsed, one was an undernourished elderly man, one was an uncooperative alcoholic, and the third has yet to be fully investigated. It is unlikely that surgery could have been employed in either of the first two cases. It is, therefore, difficult to postulate that the use of surgery for closed lesions would have improved results.

The patients discharged with cavitation but negative sputum findings have done well so far. In five the cavities have closed. The only one whose disease became active has maintained negative sputum findings, but suffered a surgical complication. These results suggest that prolonged chemotherapy may offer adequate treatment to some at least of the patients whose cavities do not close early, and that late closure may occur in some cases. In the present series, surgery could not have improved the course to date of the patients in this group.

Although sensitivity tests were not done as a routine (and this is recognized to be a shortcoming) the circumstances of the cases in which sputum findings remained or became positive would not suggest that bacterial resistance was responsible. On the other hand, it is apparent that social and personal factors, by preventing the regular taking of chemotherapeutic agents, have been the chief causes of failure of treatment to arrest the disease. In particular, the few alcoholics have been a difficult group. In the presence of social problems, early use of surgery in suitable cases may lead to a more favourable outcome; but the patient should, if at all possible, still be kept to a desirable chemotherapeutic programme in the post-operative months.

We are convinced that physicians should make every effort to adhere to drug combinations and doses of proven safety. None the less, it is to be noted that the results described were obtained in spite of the fact that, in one or two cases, some compromises were made with the accepted drug dosage. It is, moreover, well known that out-patients frequently fail to take their drugs regularly.

For example, Tennant found that 28% of Repatriation out-patients supposedly taking PAS gave negative responses to ferric chloride tests. Further, in this series, calcium B-PAS was used in some cases late in treatment, and Lewis (1958) has recently cast doubt on the value of this drug as an anti-tuberculous agent.

In our cases, these possible and actual irregularities in drug therapy occurred mainly in the late stages of treatment. Nearly all the patients had a long period of supervised in-patient treatment with regular drug administration, PAS when used being given as the sodium salt. It is, then, possible that this period of "good" drug therapy militated against relapse at the later period, when drug therapy may have fallen short of current standards. (If this is so, it follows that out-patient chemotherapy in the early stages of treatment (Research Committee of Tuberculosis Society of Scotland, 1957) should be reserved for reliable and cooperative patients, those less reliable being treated under supervision as in-patients for a long enough period to make relapse unlikely.) Experience at Sully (Cotter *et alii*, 1958) would suggest that a safe period for this stage of chemotherapy is eight months.

For the full duration of chemotherapy, a minimum period of one year after sputum conversion, cavity closure or operation, whichever is the latest, has been proposed (Ross *et alii*, 1958). This may not be practicable in cases of persistent cavitation, but in other respects may be satisfactory. In view of our few relapses, however, three of which occurred after chemotherapy had been stopped, we would suggest that it is inadvisable to treat any patient for less than two years.

Most of our patients fit to do so—38 of 48 patients aged under 60 years—have returned to work. However, it has been most difficult to find suitable work for those men aged over 40 years who had done only heavy unskilled or semi-skilled work, and who have no aptitude for clerical or light skilled work. With the increasing proportion of elderly males among new cases, this problem will assume greater importance.

#### Conclusions.

On the results obtained with these patients, the following conclusions appear reasonable.

1. The minimum period of chemotherapy should be one year after sputum conversion, cavity closure or operation, whichever is the latest, but should not be less than two years in all.
2. Non-cavitated residual lesions are not, of themselves, an indication for surgery.
3. Cavities may close in the second year of chemotherapy; hence persistence of cavitation after some arbitrary period of chemotherapy is not, of itself, an indication for surgery.
4. Further trial of very prolonged chemotherapy in cases of persistent cavitation, with the aim of producing so-called "open-healing", is fully justified.
5. Social and domestic factors are of great importance, and must be taken into consideration when the treatment of patients is being planned.

#### Summary.

Sixty-three male patients, treated at the Repatriation Sanatorium, Kenmore, for pulmonary tuberculosis, and discharged in the year 1956, have been followed up as out-patients for two to three years after their discharge. All patients received prolonged multiple drug therapy, and 10 were treated surgically.

One patient died of tuberculosis. Of the others, seven have shown evidence of activity (transient in three), and the reasons for this are analysed.

The overall results are discussed, and certain conclusions have been reached.

#### Acknowledgements.

We thank the many members of the staff of Repatriation institutions who assisted us in the collection of data for

this paper, and the Chairman of the Repatriation Commission for permission to publish it.

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### NEW TECHNIQUE—BURR BIOPSY OF CERVIX: ITS USE IN 113 CASES.

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In this paper, the use of a new method of cervical biopsy in 113 cases is described, and the results of the biopsies are given.

#### The Method.

The instrument used to make the biopsy can be described as a burr. These burrs are readily obtained, and are manufactured as soft metal rotary files. Their shapes are spherical, cylindrical and conical in varying diameters, and they are attached to a shank. The cutting edges run the length of the burr, and are spaced about 1 mm. apart. These cutting edges also have a slight spiral curve.

In normal use, the file or burr is attached to an electric power drill. In its use for biopsy, the shank can be pushed into a soft metal tube, which holds it quite firmly. The force used in the biopsy is not great. If the tube is 10 to 12 in. long, it acts well as a handle to apply the burr to the cervix.

#### Points in Technique.

The cervix is viewed with a speculum. No anaesthesia is required. Most cervixes can be controlled without the use of a tenaculum.

The main object in using the burr is to rotate it in such a way that all the mucosa of the cervical canal and the squamous junction of the portio vaginalis is removed. This, of course, eliminates the difficult choice of the site to make the biopsy.

The cervix varies very widely in shape, the common denominator being the open external os of the multipara. This lends itself very well to the conical burr. The burr can be rotated in the canal, and it will readily remove the mucosa and the squamous junction.

When the canal is closed, as in the nullipara and in menopausal atrophy, a smaller, more pointed burr is used.

The squamous junction is readily removed, but the mucosa of the canal presents more difficulty. By angling the axis of the burr to the axis of the cervical canal, as the burr is cutting, all the walls of the canal can be reached.

The opposite extreme occurs when the cervix is widely open or irregular. There may be islands of squamous mucosa surrounded by incomplete columnar epithelium. Here the spherical burr will cut to the best advantage. By angling the axis of the burr, it can be made to cut on a plane which is transverse to the axis of the canal.

The amount of mucosa in the cervix varies greatly. In the average cervix, a readily visible amount of tissue is obtained. Of course, if there is an overgrowth of tissue, considerable amounts are obtained, particularly when a naked-eye diagnosis of cancer can be made.



FIGURE I.

There are a few cervical canals which seem to be denuded of epithelium. These give a gritty feeling when the burr is rotated. The material will be scanty, but none of the cells are lost in preparation. These sections are still quite satisfactory for diagnosis.

The elasticity of the cervix is a very ready aid in applying the tissue to the burr in all these manoeuvres.

#### Preparation.

The burr is placed immediately in fixing fluid—10% formaldehyde-saline or Bouin's fluid. If the metal burr remains too long in the fixing fluid, rusting will occur. The rusting contaminates the specimen and takes the edge from the cutting ridges.

The material is scraped from the grooves of the burr by means of an old hypodermic needle or with coarse nylon bristles directly back into the fixative. If Bouin's fluid is used, tissue should not be left in it more than 48 hours. Removal of the tissue from the burr should be done within the first 30 minutes.

Tissue and fixative are transferred to a flat-bottomed "Polystyrene" or glass tube, preferably no more than 1 to 1.5 cm. in diameter and about 7 to 8 cm. in length. The tube is centrifuged, and the supernatant fluid is withdrawn or poured off and replaced with 50% alcohol. This in turn is centrifuged, supernatant is poured off, and so on through the various alcohols, clearing agents, etc., normally used and for the times normally used. In the final step paraffin is added to the tube, vacuum embedding is carried out and the paraffin is allowed to set after quick centrifugation to bring the tissue fragments to the bottom and preferably the centre of the tube.

When the paraffin is thoroughly set, the tube is broken and the cylindrical paraffin button is mounted on a block holder with the lower tube surface as the cutting face. Sections are cut, mounted and stained in the usual way.

#### Results.

These patients have presented themselves with a gynaecological symptom or symptoms—e.g., bleeding, discharge or pain. Their ages were between 40 and 60 years. Cases were not included in the group in which carcinoma of the cervix could be diagnosed by inspection of the cervix, or in which the diagnosis was suspected by the doctor referring the patient.

It was thought that these results might give some indication of the relative frequency of the changes in the cervical mucosa, non-malignant and malignant. The figures cannot be regarded as statistically valid, because they are derived from a selected sample of patients in which no exact diagnosis could be made on inspection of the cervix.

The conditions found were as follows: inflammation, 33 cases; parakeratosis, 11 cases; dyskeratosis, 19 cases; squamous metaplasia, 13 cases; carcinoma-in-situ, 2 cases; carcinoma, 1 case.

Two of these conditions may be present in the one cervix. It is of interest to see the frequency of the benign conditions and the conditions which are thought to be the precursors of carcinoma. It is beyond the scope of this report to discuss the relationship of these conditions.

#### Ideal Method: Hypothetical.

The ideal method is one which can be carried out by a simple technique in the doctor's office and gives 100% accurate diagnosis of cancer of the cervix. This is not an easy goal to achieve. The difficulties which relate to this achievement are haemorrhage, the choice of site of the biopsy, the irregularity of the cervix, the quantity of the material required and possible interference with further treatment.

Haemorrhage is the factor which has forced many biopsies to be done in the operating theatre under general anaesthesia. If adequate amounts of tissue are to be obtained, instruments with sharp cutting blades, or a simple scalpel, have to be used.

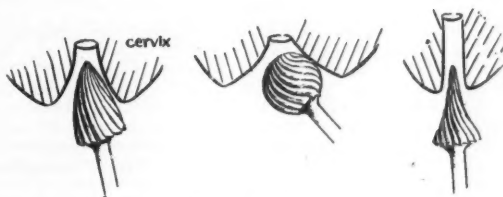


FIGURE II.

The site of the biopsy is a much more controversial subject. When there is an area of change obvious on the cervix on clinical examination, there is no argument; but when the cervix is symmetrical and normal in appearance, tissue must be taken from the whole cervical canal and the squamous junction. This circumstance favours the ring biopsies and the cytology methods.

The irregular cervix, caused by childbirth and direct trauma, presents a mechanical problem. The biopsy must be able to trace out all the curves of the cervical canal.

The quantity of material is dictated by the needs of the pathologist. He prefers to have the whole cervix to subject to his serial blocking, and if necessary serial section preparation. He realizes more than anyone that the early changes leading up to true malignancy are to be found in only a small area. He is very justified in his fear that if the material is not adequate, the initial area may be overlooked. Some cervical canals have thin epithelial lining, and curettage appears to produce no result to the naked eye. The tissue under the instrument feels hard and fibrous. These cervixes always raise the doubt of adequacy of material.

#### The Merits of Burr Biopsy.

When the burr is used in an effective way, the whole of the epithelial lining of the cervical canal and the squamous junction is removed. Ribbons and clumps of cells of sufficient size to be readily recognized under the microscope are produced. These sheets of cells are the thickness of the lining of the canal. In malignancy, with the overgrowth of the cells, thicker sheets are obtained.



This can be appreciated when the biopsy is being done, as more tissue is seen on the burr.

The burr does not cut into the underlying muscle layers, and so the blood vessels are not laid open. Bleeding is slight and does not need any measure directed against it.

The quantity of the material is usually satisfactory. The hard, fibrotic cervix with the atrophic epithelium of the post-menopausal woman gives the minimum of tissue.

We have found that burr biopsy is an easy office or out-patient procedure, which can be repeated if necessary without inconvenience or undue expense to the patient.

In post-menopausal women, an endometrial biopsy can be easily included in the same block preparation.

The three photomicrographs (Figures III, IV and V) demonstrate the sheets of cells seen in these biopsies. One is low-power and two are high-power.

## Reports of Cases.

### PULMONARY NOCARDIOSIS: REPORT OF A FATAL CASE.

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The genus *Nocardia* is a group of fungus-like organisms which is closely related to the genus *Actinomyces*, but which grows aerobically and is sometimes partially acid-fast. Infections due to pathogenic *Nocardia* species fall into the following two groups: (i) infections involving viscera, bone or other structures with or without skin lesions (systemic nocardiosis); (ii) infections confined to the skin, sub-cutaneous tissue and bone (localized nocardiosis).

The first group was fully reviewed by Ballenger and Goldring (1957), who listed all the previously reported cases, a total of 95. In these, the lungs were involved in 67 cases, the brain in 29, the skin and subcutaneous tissues in 29, and other structures less frequently. Two of the cases listed by Ballenger and Goldring occurred in Australia (Goldsworthy, 1937; O'Reilly and Powell, 1953). Subsequently a case was reported from New Zealand (Hiddlestone, 1957).

In the case described below at necropsy extensive pulmonary nocardiosis was found. The fatal illness was acute pneumonia, with left lung consolidation. The whole illness lasted three weeks.

#### Clinical Record.

A female patient, aged 56 years, presented on June 16, 1959, having suffered for five days from malaise, heaviness in the head, shivers and vague chest pain, which was not suggestive of pleurisy. There was neither cough nor dyspnoea. The temperature was 102° F., and the chest was normal on clinical examination. She was regarded as suffering from an influenza type of infection, and phenoxymethyl penicillin (250 mg. orally every six hours) was prescribed. At a previous consultation in March, 1959, she had told her doctor that she was an alcoholic, and on that occasion her blood pressure was 180/100 mm. of mercury. Three days later she had the same symptoms, with cough and sputum in addition. The temperature was 101° F., and chest examination again revealed no abnormality. It was noted that no more than three or four of the penicillin tablets had been taken. "Synermycin" (tetracycline 167 mg. and oleandomycin 83 mg.) was prescribed every six hours, and the patient was instructed to call the doctor again.

<sup>1</sup> For Figures III, IV and V see art-paper supplement.

On June 25, her doctor was called, and the patient was found to be seriously ill, with toxæmia, cyanosis, a temperature of 103° F. and clinical signs of consolidation of the lower lobe of the left lung. The treatment was changed to procaine penicillin, 900,000 units twice a day, and sulphadiazine, 1.0 gramme every four hours. Two days later she was desperately ill, with twitching, delirium, intense cyanosis, tachypnoea, severe dehydration, a temperature of 102° F. and a blood pressure of 85/60 mm. of mercury. The clinical findings in the chest were those of left lung consolidation, and in addition the trachea was slightly displaced to the right side and there was marked paradoxical movement of the left side of the chest.

Subsequent drug therapy is described below. Slight improvement seemed to occur during the next day or so, but the clinical state was essentially the same, and she died on July 2, exactly three weeks from the onset of the illness.

From June 27, the patient received crystalline penicillin (900,000 units) and cortisone acetate (50 mg.) every six hours, and oxytetracycline (100 mg. every four hours), all by intramuscular injection. From the next day, chloramphenicol by mouth (1.0 gramme statim and 0.5 gramme every six hours) was added. On June 30, penicillin was stopped, and the administration of streptomycin (1.0 gramme every four hours) was begun. The dose of cortisone was lowered slightly after two days.

The patient was admitted to the Mater Misericordiae Hospital, North Sydney, on June 30, 1959, and on that day blood examination showed the haemoglobin value to be 10.8 grammes per 100 ml., and the white cells to number 3500 per cubic millimetre (neutrophils 84%, lymphocytes 14%, monocytes 2%). A sputum culture prepared on June 29, by Dr. Leonard Carter was reported as growing *Klebsiella pneumoniae* and *Monilia*. An X-ray film of the chest, taken on June 30 (Figure I),<sup>1</sup> was reported on by Dr. John Cashman as follows:

There is fairly uniform opacity of the entire left lung. Mottled opacity is present in the right lung. The appearance suggests an extensive inflammatory lesion, probably with some effusion on the left side. If anything the mediastinum is displaced slightly to the right.

At no time did the physical signs suggest a collection of pleural fluid, and an exploratory paracentesis made on June 30 yielded neither fluid nor pus. The right lung was normal on clinical examination until June 30, when basal crepitations developed.

#### Necropsy Findings.

Necropsy was performed 18 hours after death, on July 3.

Externally, no skin, aural or ocular lesions were visible. The pericardial pericardium showed a few scattered petechial haemorrhages. The pericardial cavity was otherwise normal. The coronary arteries showed minimal atheroma without significant diminution of lumen, the heart being otherwise normal. No fluid was present in either pleural cavity. Fibrinous adhesions were present between the visceral and parietal pleura of the left pleural cavity overlying the superficial suppurative lesions of the left lung. During removal of the left lung from the thoracic cavity, the visceral pleura overlying these lesions ruptured and yellowish-grey pus exuded. The right pleural cavity was normal.

All lobes of both lungs showed numerous scattered areas of grey, firm, bronchopneumonic consolidation. In the right lung, these lesions were uniformly distributed throughout all lobes, and measured from 0.2 to 2.0 cm. in maximum diameter. It was obvious that the larger lesions had been formed by confluence of small lesions. The left lung showed the same grey, firm, bronchopneumonic lesions undergoing confluence. In the upper lobe of the left lung, the whole of the inferior two-thirds of the lobe showed diffuse consolidation due to complete confluence of the lesions. The lower lobe of the left lung showed similar lesions measuring from 0.2 to 3.5 cm. in maximum diameter. In both lungs, the larger of the confluent lesions showed suppurative liquefaction in their central areas, yellowish-grey pus being present. In none of the lesions was there any macroscopic evidence of

<sup>1</sup> For Figures I, III, IV and VIII see art-paper supplement.

fibrosis. The bronchial tree of both lungs showed acute mucosal congestion, and the bronchial lumen was almost filled with yellowish-grey purulent exudate. The hilar lymph nodes and the pulmonary vascular tree appeared normal.

The larynx and trachea showed acute mucosal congestion only.

The oral cavity, tongue, pharynx, oesophagus, thyroid, mediastinum, liver, spleen, adrenals, gastro-intestinal tract, kidneys, ureters, bladder, abdominal lymph nodes, peritoneum, brain, meninges and sternal bone marrow appeared normal. The body of the uterus showed multiple intramural leiomyomas measuring up to 5.0 cm. in maximum diameter. No other abnormality was present in the uterus, and the ovaries, Fallopian tubes and vagina appeared normal.



FIGURE II.

Coronal section of the left lung, showing discrete bronchopneumonic lesions throughout, with marked confluence in the upper lobe. Note exudate filling left upper lobe bronchus. ( $\times 3/8$ .)

Bacteriological studies gave the following results.

1. Smears from the bronchopneumonic lesions of both lungs showed extremely numerous, Gram-positive, filamentous branching organisms. The filaments were extremely thin, measuring approximately  $1\mu$  in diameter. "Granule" formation and "clubbing" of the ends of the filaments were absent. With the use of a conventional Ziehl-Neelsen stain, which employed 20% sulphuric acid for 10 minutes for decolorization, the organisms were not acid-fast. However, with the use of a modified Ziehl-Neelsen stain, employing 1% sulphuric acid for five minutes in decolorization, the organisms were acid-fast. Smears from the bronchial exudate were stained as described above and revealed the same features, except that branching of the organism, although present, was not prominent, and that numerous fragmented bacillary and coccobacillary forms of the organism were present. In all the above-mentioned smears, no other organisms were seen.

2. Cultures from the lesions of both lungs and from the bronchial exudate yielded pure growths of *Nocardia asteroides*.

Sensitivity tests were carried out by the disc method on horse-blood-agar heavily inoculated from a glucose-broth culture. The tests were read after sixteen hours' incubation at 37°C., with the following results. (The figures in parentheses indicate the amount of antibiotic or chemotherapeutic agent per disc.) The organism was sensitive to streptomycin (80  $\mu$ g.), chloramphenicol (100  $\mu$ g.), tetracycline (100  $\mu$ g.), oxytetracycline (100  $\mu$ g.), chlortetracycline (100  $\mu$ g.), erythromycin (10  $\mu$ g.), nitrofurantoin (10 mg.), sulphafurazole (1 mg.), and neomycin (100  $\mu$ g.), and was insensitive to penicillin (2.5 I.U.), bacitracin (100  $\mu$ g.), oleandomycin (20  $\mu$ g.), novobiocin sodium (10  $\mu$ g.) and nystatin (200 units).

Histological studies gave the following results.

1. In haematoxylin and eosin preparations, the pulmonary lesions consisted of foci of acute bronchopneumonia show-

ing confluence. The earliest lesions consisted of terminal or respiratory bronchioles filled with necrotic inflammatory cells and granular cell debris, and showing widespread necrosis of the bronchiolar walls. The surrounding alveoli were filled with necrotic inflammatory cells and granular cell debris, and the alveolar walls showed almost complete necrosis. At the periphery of these early predominantly necrotic lesions, a thin but well-defined zone of histiocytes was present, with occasional lymphocytes and polymorphs. Also present in this predominantly histiocytic zone were scattered epithelioid cells and cells considered to be transitional between histiocytes and epithelioid cells. Aggregation of epithelioid cells to form "tubercles" was not observed, and giant cells were absent. External to the histiocytic zone, the alveolar walls were congested and the lumens showed small amounts of fibrin and oedema fluid and small numbers of histiocytes. The nature of the inflammatory cells present in the affected bronchioles and surrounding alveoli and representing the initial inflammatory-cell response to nocardial infection was not easily determinable, because of the wide-spread necrosis of these cells. However, it did appear that the cells present initially in these lesions were histiocytes and polymorphs in variable proportions and occasional epithelioid cells. In the greater part of the necrotic areas of the lesions, cell outlines and sometimes nuclear outlines were visible. However, in some areas the necrotic cells had been completely reduced to finely granular debris, with close simulation of the necrosis seen in tuberculosis and other forms of caseating granuloma. In the confluent lesions, the same basic appearance of widespread necrosis with a thin peripheral zone of histiocytes, epithelioid cells, polymorphs and lymphocytes was present. However, in addition, the central areas of these lesions showed extremely numerous polymorphs, which appeared to represent a second migration of polymorphs into the already necrotic lesions. Fibroblasts and fibrosis were conspicuously absent from all the lesions examined. In haematoxylin and eosin preparations the organism could definitely not be seen.

2. In Gram-stained preparations, the pulmonary lesions all showed extremely numerous filamentous, branching, Gram-positive organisms, which were particularly noticeable immediately internal to the peripheral, predominantly histiocytic zone described above. In our hands, the periodic-acid Schiff (PAS) stain of McManus (1946) failed completely to demonstrate the organism. A modified Ziehl-Neelsen stain for histological sections (Putt, 1951) vividly demonstrated the organism as acid-fast branching filaments. A conventional Ziehl-Neelsen stain for histological sections failed completely to demonstrate the organism. In Gram and modified Ziehl-Neelsen preparations, the organism showed neither "granule" formation nor "clubbing" of the ends of the filaments.

3. Sections of the left ventricle, both kidneys, both adrenals, the liver and the spleen showed no significant abnormality.

The final necropsy diagnosis was acute systemic nocardiosis limited to the lungs (acute pulmonary nocardiosis), uterine leiomyomas and coronary atheroma.

#### Bacteriological Considerations.

In 1888, Nocard isolated an aerobic, acid-fast actinomycete from "*farcin du bœuf*", a disease of cattle. This was the first recorded isolation of a pathogenic, aerobic actinomycete. In 1889, Trevisan named this organism *Nocardia farcinica*.

The first pathogenic aerobic actinomycete isolated from a human infection was described by Eppinger in 1890. This organism was isolated at necropsy from an adult male showing cerebral abscesses and meningitis, and was named *Cladothrix asteroides* by Eppinger. In 1896, Blanchard renamed this organism *Nocardia asteroides*. The first isolation of a pathogenic aerobic actinomycete from a localized chronic suppurative lesion of skin, subcutaneous tissue and bone was that of Vincent, who in 1894 isolated such an organism in a case of Madura foot. This organism is now known as *N. madura* and is one of the non-acid-fast members of the genus *Nocardia*. Since Vincent's original isolation, 13 strains of *Nocardia*, some

of which have been acid-fast, have been isolated from such lesions known as Madura foot or mycetoma pedis (Waksman, 1950).

Thus two forms of human infection with members of the genus *Nocardia*—human nocardiosis—can be recognized as follows: (i) Systemic nocardiosis, involving lungs, brain, skin and subcutaneous tissue, heart, kidneys, liver and other structures. The lungs are almost always the primary site of infection, lesions of the other organs resulting from haematogenous dissemination from the primary pulmonary lesion. It is generally accepted that this form is always due to *N. asteroides*. (ii) Localized nocardiosis, consisting of a localized chronic suppurative lesion of skin, subcutaneous tissue and bone, with no evidence of haematogenous dissemination to other sites.

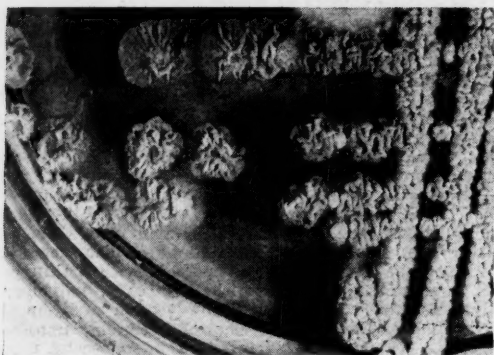


FIGURE V.

Glycerol agar culture of *N. asteroides*, showing cerebriform colonies (14 days' incubation). (x 2.)

Thirteen strains of *Nocardia*, some of which have been acid-fast, have been isolated from these lesions (Waksman, 1950).

A third form of human nocardiosis was recently described by Cuttino and McCabe (1949), under the title "pure granulomatous nocardiosis". The pathological basis consisted of histiocytic granulomas with intracellular parasitism of the histiocytes by a previously undescribed member of the genus, *N. intracellularis*.

The following tabulation has been compiled from data in the seventh edition of Bergey's "Manual of Determinative Bacteriology" (1957), and shows the position of the genus *Nocardia* in the classification of organisms of the division Protophyta (primitive plants).

Division: Protophyta (primitive plants).

Class II: Schizomycetes (bacteria and related forms).

Order V: Actinomycetales (thin elongated bacterial cells with a definite tendency to branch).

Family II: Actinomycetaceae.

Genus I: *Nocardia* (obligatory aerobic, saprophytic, some strains partially acid-fast, grows well at 20° C.).

Genus II: *Actinomyces* (anaerobic or microaerophilic, parasitic, non-acid-fast, no growth or poor growth below 30° C.).

Species Group (*Nocardia*) I: Acid-fast species: 19 species, seven of which are pathogenic for man or animals or both. Includes *N. farcinica* and *N. asteroides*.

Species Group (*Nocardia*) II: Non-acid-fast species: 26 species, eight of which are pathogenic for man or animals or both. Includes *N. madurae*.

The family Actinomycetaceae is characterized by the production of true mycelium, which is non-septate during the early stages of growth, but which later may become septate and break up into short segments, rod-shaped or spherical, or the mycelium may remain non-septate and produce spores on aerial hyphae. The family Actinomycetaceae is divided into two genera: (i) *Nocardia*,

characterized by aerobic growth, saprophytic existence and acid-fast properties of some species; (ii) *Actinomyces*, characterized by anaerobic or microaerophilic growth, parasitic existence and absence of acid-fast properties in all species.

*N. asteroides* has the following properties. In smears of sputum, pus or exudates from human lesions, the organism presents as Gram-positive, thin, elongated branching filaments, with fragmentation into bacillary, coccobacillary and coccid forms. Often branching may not be seen, because of marked fragmentation of the filaments into short bacillary forms. Interlacing of the branching filaments with each other is frequently seen, but actual "granule" formation is rare, and "clubbing" of the ends of the filaments never occurs. The organism is

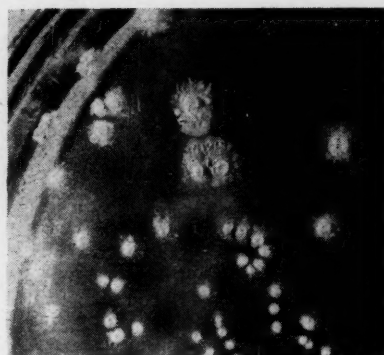


FIGURE VI.

"Eugonagar" (B.B.L.) culture of *N. asteroides*, showing stellate colonies with mycelial edges (14 days' incubation). (x 2.)

acid-fast, but the degree of this property varies with different strains. Most strains are weakly or partially acid-fast, requiring weaker decolorization than is employed in the conventional Ziehl-Neelsen stain in order to demonstrate this property. For these weakly or partially acid-fast strains, decolorization with 1% sulphuric acid for five minutes instead of 20% sulphuric acid for ten minutes, as in the conventional Ziehl-Neelsen stain, is recommended, and was effective in demonstrating this property of the organism in our case. However, a few strains have been as strongly acid-fast as *Mycobacterium tuberculosis*, and when bacillary forms of such strains are present in sputum, they are morphologically indistinguishable from *M. tuberculosis* in conventional Ziehl-Neelsen preparations (Peabody and Seabury, 1957). In cultures, the organism grows readily at 20° and 37° C., and is aerobic, no growth occurring under anaerobic conditions. Growth occurs readily on all simple laboratory media, and is usually visible after 16 to 72 hours. On solid media, the colonies appear initially as ball-like mycelial colonies, but soon develop a well-defined central elevation, often radially striated, surrounded by a thin layer of mycelial growth. After 14 to 21 days many of the colonies are often distinctly stellate; hence the species name *asteroides*. On glycerol agar, at 37° C., growth is particularly luxuriant; but the colonies lack the mycelial periphery seen on other solid media, and the surfaces of the colonies become convoluted and cerebriform. On all solid media the growth is initially white, but within three to five days becomes yellowish, orange, ochre or red in colour owing to pigment production.

*N. asteroides* leads a saprophytic existence in nature, and has been isolated frequently from soils and plant material (Gordon and Hagan, 1937; Halibi, 1947; Emmons, 1951). The mode of infection of man is unknown, and there is no evidence of transmission from man to man or from animal to man. The high incidence of primary pulmonary lesions in systemic nocardiosis points to the



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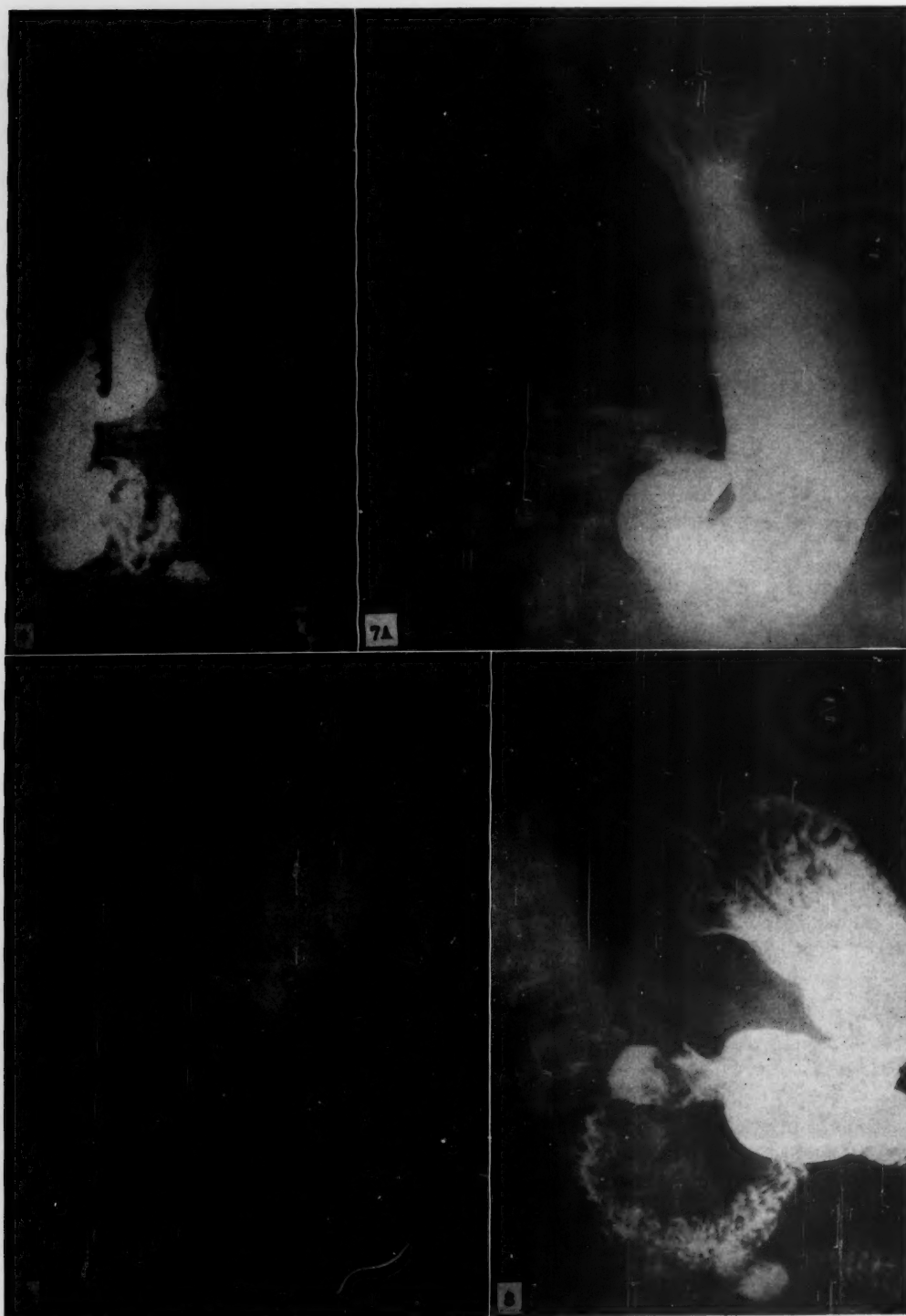
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ILLUSTRATIONS TO THE ARTICLE BY GEOFFREY HAGARTY.





ILLUSTRATIONS TO THE ARTICLE BY MALCOLM DRUMMOND  
AND MURRAY MOYES.



FIGURE III.

Low-power view of cervical squamous epithelial fragments obtained by means of burr.



FIGURE IV.

High-power view of area in Figure I. Very marked dyskeratosis with overlying prominent parakeratosis.

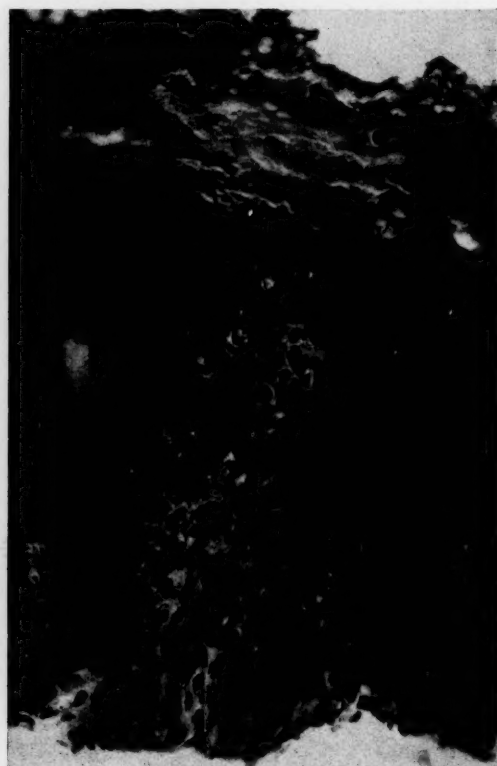
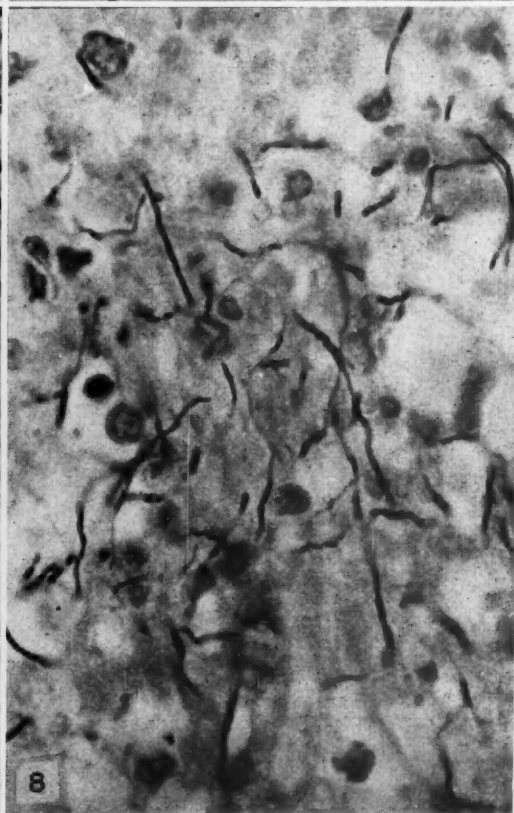
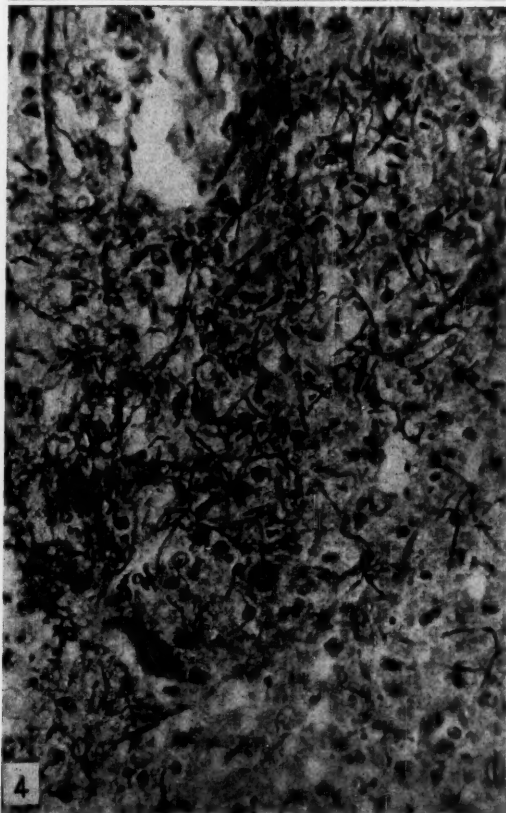
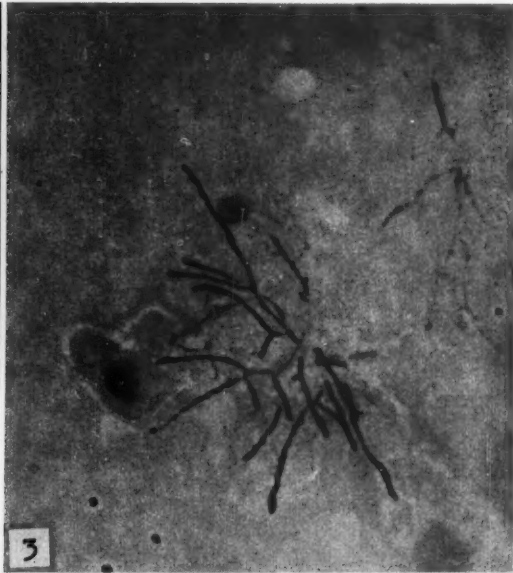
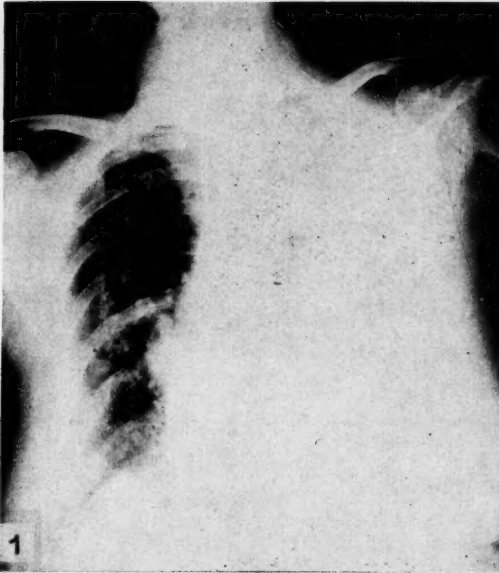


FIGURE V.

High-power view of further area in Figure I, showing dyskeratosis, some hyperkeratosis and slight parakeratosis.

ILLUSTRATIONS TO THE ARTICLE BY DERMER E. SMITH AND JOHN BENECKE.



ILLUSTRATIONS TO THE ARTICLE BY JOHN KEMP AND EDMUND COLLINS.



FIGURE I.

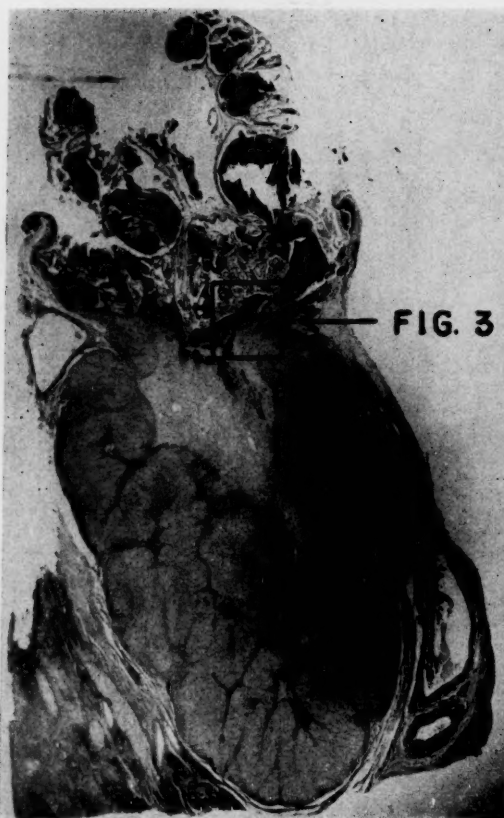


FIGURE II.

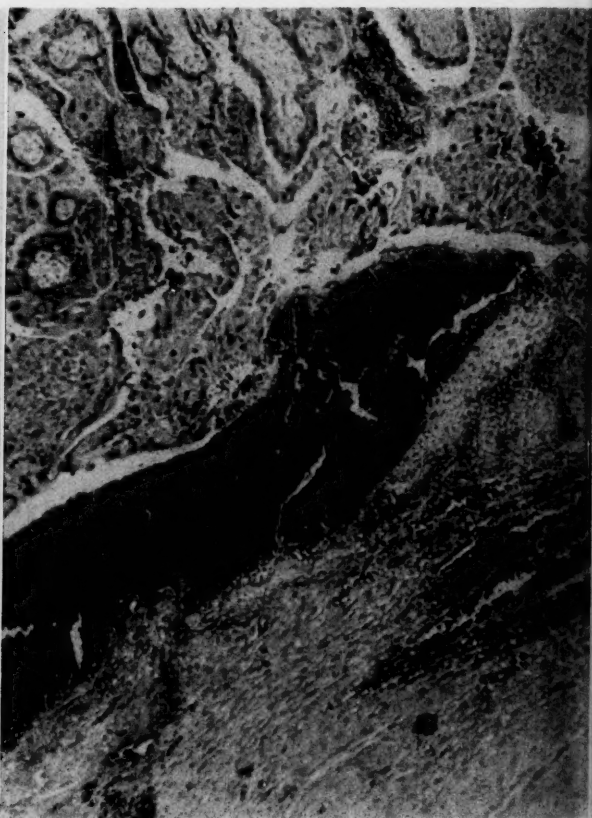


FIGURE III.







respiratory tract as the usual site of entry. There is no evidence of facultative parasitism of man.

The laboratory diagnosis of systemic nocardiosis depends entirely upon isolation of the organism. Pus, sputum or exudate should be examined by Gram's stain and by the modified Ziehl-Neelsen method described above. Cultures of all suspected material should be made on glucose-blood agar or similar enriched nutrient agar and on Sabouraud's glucose agar, and incubated aerobically at 37°C. and at room temperature. Final identification of the organism as *N. asteroides* is made on the colonial appearances of aerobic cultures, on the pigment production, on the acid-fast property and on the morphology of a Gram-positive filamentous branching and fragmentating organism. As *N. asteroides* is occasionally a secondary invader of other pulmonary lesions, absolute proof of primary pathogenicity can be obtained only by histological demonstration of the organism in the granulomatous or suppurative lesions.



FIGURE VII.

Coronal section of hilar region of left lung, showing exudate filling left upper lobe bronchus. In smears of this exudate numerous filaments of *N. asteroides* were seen. (x14.)

#### Pathological Considerations.

In systemic nocardiosis, the lungs are primarily or secondarily involved in the majority of cases. The lesions consist of acute bronchopneumonic lesions, which undergo confluence and later show frank suppuration. Extension of the lesions to involve the pleura and also to produce empyema is frequent. In most cases there is evidence of haematogenous dissemination to other organs, the commonest site of metastatic lesions being the brain. The histological picture is initially one of acute bronchopneumonia, the inflammatory cells present being histiocytes, epithelioid cells and polymorphs. Widespread necrosis of the inflammatory cells and the alveolar and bronchiolar walls occurs early, and in some lesions the necrosis resembles that seen in tuberculosis and other caseating granulomas. When this type of necrosis is present, the lesions closely simulate acute tuberculous bronchopneumonia. Subsequently frank suppuration with intense polymorph infiltration occurs in the central areas of the lesions. Aggregation of epithelioid cells to form tubercles does not occur, and giant cells are rarely present in the lesions. If death does not occur at this stage, the lesions progress to chronic suppurative lesions with no distinctive microscopic features. The above-mentioned microscopic appearances are those seen in haematoxylin and eosin preparations, and the organism is not seen in such preparations. However, with Gram stains and modified Ziehl-Neelsen stains (Putt, 1951) the lesions show extremely numerous Gram-positive, acid-fast, filamentous, fragmentating and branching organisms. The organisms are generally diffusely scattered through the lesions, and aggregation of the organism to form "granules" is rare; likewise "clubbing" of the ends of the filaments does not occur. In organs other than the lungs the histological picture is one of acute or

chronic suppuration, and again numerous organisms are present in Gram-stained and modified Ziehl-Neelsen stained preparations.

#### Clinical Features.

The previously reported cases of systemic nocardiosis with pulmonary lesions show that the illness may be acute, subacute or chronic. Most reports have been of a subacute or chronic type of illness that is easily confused with pulmonary tuberculosis, bronchial carcinoma or organizing pneumonia. However, several acute cases of the type recorded here have been recorded. Many of the reported cases have been fatal, the mortality rate in the series of 95 cases reviewed by Ballenger and Goldring in 1957 being 68.4%.

Sulphonamide drugs are generally regarded as the chemotherapeutic agents of choice. *Nocardia* species are sensitive to several antibiotics *in vitro*, but results *in vivo* with such antibiotics do not seem equally satisfactory. In experimental nocardial infections, sulphadiazine is the only drug shown to be 100% effective (Strauss, Kilgman and Pillsbury, 1951). Most of the reported recoveries from systemic nocardiosis have followed the use of sulphonamide drugs, either alone or in combination with antibiotics and surgical drainage.

#### Discussion.

The diagnosis of this case was made solely from necropsy findings, and such failure to diagnose systemic nocardiosis during life is common. Of the 95 cases of systemic nocardiosis reviewed by Ballenger and Goldring in 1957, 38 were diagnosed solely from necropsy findings.

The short period of medical observation militated against diagnosis in this case; but we believe that repeated examinations of the sputum would have revealed *N. asteroides*, as the organism was so easily seen in and recovered culturally from the bronchial exudate present at necropsy. There was no evidence in the necropsy findings that *K. pneumoniae* played any pathogenic role in the lung lesions. *K. pneumoniae* was isolated at the only sputum examination made during life, four days prior to death. The finding of this organism in sputum often lacks any pathogenic significance, because it has been found in the respiratory tract of from 1% to 5% of normal persons (Bloomfield, 1921), and has been isolated from the lungs of patients suffering from such diverse lesions as influenza, bronchiectasis and tuberculosis. *K. pneumoniae* can certainly cause primary bacterial pneumonia, but pathogenicity can be reasonably assumed during life only after repeated recovery of the organism from sputum and after failure to demonstrate a more significant organism in the sputum.

Several features of the pathology of this case were of interest. Histologically, some of the early primary lesions were distinctly similar to the lesions of acute tuberculous bronchopneumonia in haematoxylin and eosin preparations. In many case reports it has been stated that the PAS stain of McManus readily demonstrates *N. asteroides* in histological sections. However, in this case the organism in histological sections was completely PAS-negative, and could not be demonstrated despite the fact that staining was well controlled. It is of note in this regard that McQuown (1955) reported that his results with a similar staining technique, "periodic acid-fuchsin", were unsatisfactory.

The absence of evidence of haematogenous dissemination from the lung lesions is of note. Presumably this feature was due to the fact that the patient did not survive long enough for metastatic lesions to become established, or that metastatic lesions were in fact present, but were not visible to the naked eye at necropsy.

Several clinical features of this case are of particular interest. The illness started as an influenzal type of illness without abnormal findings in the chest. It is open to speculation whether the first symptoms were due to nocardiosis, or whether *Nocardia* came as a secondary invader superimposed on a bacterial or viral respiratory tract infection.



The final stages of the illness were regarded during life as bacterial pneumonia with very severe toxæmia. A penicillin-resistant staphylococcus was considered a very likely cause; but soon after this, examination of sputum cultures suggested *K. pneumonia* as the cause. Quite large amounts of antibiotics seemed to have no definite influence on the illness, and sulphadiazine was given for only two days. It was thought that cortisone acetate may have caused the slight clinical improvement which followed its use. Cortisone therapy was used empirically, in an effort to keep the patient alive, as she was regarded as being *in extremis* at the time of its commencement.

#### Summary.

A fatal case of systemic nocardiosis with lesions limited to the lungs (acute pulmonary nocardiosis) and diagnosed solely from necropsy findings has been described. The most striking feature of the case was the acute fulminating nature of the illness, which clinically was of three weeks' duration.

#### Acknowledgements.

The writers wish to thank Dr. Barry Maguire for supply of the earlier clinical data, Dr. B. R. F. Forbes for assistance with the bacteriology, Dr. L. A. Feain for assistance with the pathology, and Mr. T. J. Waldron for the photography.

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#### Legends to Illustrations.

FIGURE I.—Antero-posterior X-ray film of the chest.

FIGURE III.—Smear of bronchopneumonic lesion, showing thin, elongated branching filaments of *N. asteroides*. (Gram stain,  $\times 1500$ .)

FIGURE IV.—Histological section of bronchopneumonic lesion, showing extremely numerous elongated branching filaments of *N. asteroides* in the inflammatory cell infiltrate. (Gram stain,  $\times 750$ .)

FIGURE VIII.—Histological section of bronchopneumonic lesion, showing elongated filaments of *N. asteroides*. (Gram stain,  $\times 1500$ .)

### PRIMARY OVARIAN PREGNANCY.

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OVARIAN PREGNANCY has always been of great interest, mainly because of the rarity of authentic cases. Only 120 cases have been reported in the literature (Durburg and Grimes, 1958), and great difficulty has been found in confirming the authenticity of numbers of these (Baden and Heins, 1952). Besides the rarity of this condition, the aetiological mechanism responsible for its occurrence holds great fascination. With these two points in mind the following case is presented.

#### Clinical Record.

Mrs. A., aged 23 years, was admitted to hospital on October 23, 1958, complaining of lower abdominal pain of sudden onset of several hours' duration, which was followed by a syncopal attack. For one week before the onset of this pain she had noticed some vague lower abdominal discomfort. Her last normal menstrual period had occurred on September 17, and for the previous week she had noticed some enlargement of her breasts. Investigation of past history revealed one normal full-term pregnancy in 1956. There was no history of genital tract infection, abortion, ectopic pregnancy or abdominal operation. Physical examination showed her to have signs of mild shock. Her blood pressure was 110/80 mm. of mercury, and her pulse rate was 110 per minute. Generalized abdominal tenderness, release tenderness and guarding were present. The cervix was soft and the uterus slightly enlarged and soft, with marked tenderness in all fornices. No definite pelvic mass was felt.

A provisional diagnosis of ruptured ectopic pregnancy was made and an immediate laparotomy performed. The peritoneal cavity contained approximately 1 litre of blood. The cause of the bleeding was found to be a ruptured cyst on the surface of the right ovary. The edges of the cyst remnant were everted, and it was about 2 cm. in diameter. There was no evidence of a foetus. The left ovary and both Fallopian tubes were normal. There were no endometriotic patches. A right oophorectomy was performed. During the operation the patient was given a transfusion of 500 ml. of blood.

Her post-operative recovery was uneventful, and she was discharged from hospital, well, 12 days after her admission.

#### Pathological Findings.

The macroscopic specimen was an ovary measuring 3.0 by 1.5 cm., at one end of which was situated the hæmorrhagic remnants of a cyst, now only 0.75 cm. in diameter. Longitudinal section of the ovary through this cyst (Figures I and II)<sup>1</sup> revealed at one extremity normal ovarian tissue; near the other extremity close to the ruptured cyst was a corpus luteum measuring 1.3 by 0.8 cm. The cyst itself contained a tangled mass of hæmorrhagic tissue.

Microscopic examination of sections (Figure III) revealed an active corpus luteum partially separated by

<sup>1</sup> For Figures I, II and III see art-paper supplement.

a thin layer of fibrous tissue from numerous villi of the trophoblast. No fetal vessels were seen in the villi.

#### Discussion.

In 1878, Spiegelberg laid down the following criteria for the diagnosis of true primary ovarian pregnancy: (i) that the Fallopian tube, including the fimbria ovarica, be intact and clearly separate from the ovary; (ii) that the gestation sac occupy the normal position of the ovary; (iii) that the sac be connected with the uterus by the ovarian ligament; (iv) that unquestionable ovarian tissue be demonstrated in the walls of the sac (Novak, 1958).

Dissatisfied with the lack of precision of the fourth postulate of Spiegelberg, Baden and Heins (1952) added a further classification. It was based fundamentally on the site of implantation and development of the fertilized ovum rather than on the site at which fertilization first occurred. The classification was recorded as follows:

1. Primary ovarian pregnancy: Ovarian tissue forms a complete intact layer around the fetus and fetal tissues. In the case of a ruptured ovarian pregnancy, the site of rupture must have been through a previously intact layer of ovarian tissue.

A. Intra-follicular: The fertilized ovum is implanted and develops in the Graffian follicle.

B. Extra-follicular: The fertilized ovum is implanted and develops in ovarian tissue other than the Graffian follicle. This type would include juxta-follicular, interstitial, cortical and superficial implantation.

2. Combined ovarian pregnancy: This type of ovarian pregnancy would be that in which the ovarian tissue formed at least portion of the tissue which lay adjacent to the fetal tissues, but not forming the entire wall by itself. An example of this would be tubo-ovarian pregnancy.

The case reported satisfied the criteria of Spiegelberg for the diagnosis of primary ovarian pregnancy. According to Baden and Heins, this pregnancy would be also extra-follicular and in the juxta-follicular position. As the implantation had occurred at the mouth of the developing corpus luteum, it was difficult to decide the latter point, and the pregnancy may have well been called intra-follicular.

In attempting to postulate a cause for this ovarian pregnancy, it became essential to revise rapidly the physiology of ovulation, tubal function and nidation. Follicular rupture and extrusion of the ovum are a prerequisite to a normal intrauterine pregnancy. It is generally understood that the rising intrafollicular pressure which results from the accumulation of liquor folliculi results in the thinning and final rupture of the surface layers followed by the release of the contents of the follicle (Rock, 1949). According to the evidence quoted by Brambell (1956), the mechanism of ovulation may be summarized under three main headings: (i) enzyme action, (ii) internal pressure, (iii) growth processes. It is suggested that proteolytic enzymes are present in the liquor folliculi, which bring about perforation by autolysis of the follicle wall. If theories invoking an increase in internal pressure are true, there are two ways in which this may occur—first, by an increase in follicular content, and secondly, by contraction of the tissue surrounding the follicle. It is well known that secretion may proceed against pressure, so that the first possibility could occur. With regard to contraction of external tissues, smooth-muscle fibres have been demonstrated surrounding the follicle; these are contractile, and may well be associated with follicular rupture and/or extrusion of the ovum. These theories of increasing internal pressure have not been supported by direct observations on rabbits, which show that on natural rupture of the follicle, fluid does not squirt out through the aperture as it does on premature artificial rupture. Growth and rich vascularization of the theca interna, though occurring in a variable amount from species to species, has been said to push the follicular contents towards the thinnest part (Brambell, 1956).

Once the ovum has left the follicle, it must next enter the tube. This passage from ovum to tube must be

under some control, the nature of which is unknown. In 1937, Westman reviewed the possible mechanism by which the ovum is transferred to the tube. He mentioned the original work of Rouget (1858), who dissected out muscle fibres in the tubo-ovarian ligament. As a result of experimental work on rabbits and on *Macacus rhesus*, Westman stated that these fibres were responsible for approximating tube and ovary at the time of ovulation. The tube itself was found to be undergoing rhythmic motions and the fimbria to sweep over the ovary. He also demonstrated a fluid current in the tube. This current causes a sucking movement towards the ostium. Westman maintained that the combined rhythmic action of the tube and ciliary motion were responsible for this.

Active movement of the ovum itself may occur, as evidenced by the well-known transclomic migration from an ovary on the contralateral side to form an ectopic pregnancy in the ipsilateral tube (Novak, 1956). It is suggested here that chemotaxis plays a great part in the guidance of the ovum into the uterine tube. The nature of such a chemotactic agent is unknown; but it may simply be the ideal pH present in the uterine tube or a secretion formed by its mucosal lining. The cells of the mucosa are known to be tall and luxuriant at the time of ovulation (Zuckerman, 1955).

There appear to be two methods by which ovarian pregnancy may occur: (i) by intrafollicular fertilization following (a) failure of follicular rupture, or (b) failure of extrusion of the ovum after rupture; (ii) fertilization of the ovum after extrusion followed by implantation (a) within the ruptured follicle (intrafollicular), or (b) on ovarian tissue other than the follicle (extrafollicular).

The possibility that fertilization may occur within an unruptured follicle is an unlikely one. It would depend on the ovum being mature before rupture, which is rarely so, as it has still to extrude the second polar body. Fertilization under these conditions would demand an extremely vigorous sperm capable of surviving in the peritoneal cavity while traversing the gap between the ovary and tube and, as well, penetrating both the follicle and the ovum. Rock (1949) thinks this is a most unlikely occurrence. However, if the ovum was retained within the follicle after rupture by either the presence of a very cohesive discus proligerus or by being caught up in the ragged mouth of the ruptured follicle, then the only limiting factor to intrafollicular fertilization would be the ability of the sperm to survive the journey through the peritoneal cavity. It is known that the survival time of spermatozoa is short in the peritoneal cavity (Rock, 1949). Rock also points out that blood inhibits the hyaluronidase produced by the spermatozoon, which is essential for penetration of the ovum. However, blood does not always fill the ruptured follicle, which may contain only a fibrinous exudate, under which circumstances intrafollicular fertilization could occur (Wilson and Ekas, 1949).

The second suggested method by which ovarian pregnancy may result demands two phases—first, the failure of the ovum to pass along the uterine tube, and secondly, reimplantation upon the ovary. Physiological dysfunction of the tube as part of the mechanism of ovarian pregnancy has been pointed out by Natrass (1951). There seems little doubt that occasionally part of the delicate and precarious mechanism for transfer of ovum to uterus may go awry. This could include failure of the ovary and infundibulum to approximate, failure of the fimbria to sweep over the site of ovulation, failure of the fluid current, or failure of chemotaxis. If the ovum enters the tube and is fertilized, ovarian pregnancy may still result if a reverse fluid current occurs, owing perhaps to antiperistalsis of the tube.

In the case presented, the condition may have occurred by the following sequence of events: follicular rupture, retention of the ovum at the mouth of the ruptured follicle and intrafollicular fertilization. As was pointed out, the limiting factor in the formation of such an ovarian pregnancy is the ability of the sperm to survive in the peritoneal cavity.

The occurrence of chronic inflammatory changes following either infection or endometriosis is a factor in ectopic pregnancy. There is no doubt that tubal distortion in such conditions may easily result in the failure of any physiological process essential to the transfer of the ovum along the uterine tube. Implantation on the ovary may occur in such an instance. In the case presented, there was no evidence of inflammation or anatomical distortion.

It is of interest that in this case of ruptured ovarian pregnancy severe haemorrhage occurred. This is not a recognized feature (Whitelaw, 1953), though Gibson (1957) did point out that it was sometimes observed.

#### Summary.

1. A case of primary ovarian pregnancy is presented.
2. The relative physiology of reproduction is briefly discussed. It is suggested that chemotactic influences may play a part in the entry of the ovum into the uterine tube.
3. Various postulates relating to the mechanism of ovarian pregnancy are discussed. It is suggested that the most likely sequence of events in the case presented is retention of the ovum within the follicle by the ragged constricted site of rupture followed by intrafollicular fertilization.
4. Severe haemorrhage occurred in this case; this has not been a feature in most previous reports.

#### Acknowledgements.

We are grateful for the invaluable help rendered by Dr. C. Graham, (Morbid Anatomist), Miss M. Simpson (Photographer), and Miss M. O'Leary (Librarian) of the Institute of Medical Research, Royal North Shore Hospital of Sydney. We also wish to thank the General Medical Superintendent of the Royal North Shore Hospital for permitting publication of this case report.

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## Reviews.

**Counter-Transference.** By Benjamin Wolstein, Ph.D.; 1959. New York and London: Grune and Stratton, Inc. 8" x 5", pp. 192. Price: \$5.50.

COUNTER-TRANSFERENCE and transference are phenomena of universal importance in interpersonal relationships, particularly in medicine generally, where they are little understood, and in psychoanalysis, where they are the focus of study. Transference of childhood images from early parental relationships into one's perceptions of people in the present lends distortions in patterns characteristic of each person's childhood. Later experi-

ences tend to modify, not change. Thus, aetiological significant aspects of childhood may be studied in adults with neurosis or psychosis. Counter-transference signifies the counter-tendency for the doctor's childhood images to distort his current image of the patient, obscuring the real disease and needs. Hence the need for analysts to have been analysed, and to enlighten their colleagues.

This book speaks for "cultural interpersonal analysis", which shares with psychoanalysis the resolution of unconscious conflicts, but which differs significantly from it. Psychoanalysts study man as biological organism, ego-centric individual and social being, functioning in, and subject to, cultures created from his adaptations to environment. Cultural interpersonal analysis limits man to a more passive product of continuing interpersonal relationships and cultural pressures which pattern him. Theoretical formulations are in terms of "states of relatedness", animistically endowed with properties of the exorcized instinctual drives. In technique, therapists intrude their personalities upon the patient to a degree, while psychoanalysts are unobtrusive, to facilitate the clear emergence of transference.

The merits of cultural interpersonal analysis and this contribution are marred by burdensome justifications on several bases. The first is the preference given to cultural interpersonal analysis and denigration of psychoanalysis, with neglect of such major contributors to psychosocial theory as Klein, Erikson and Hartmann. Secondly, there are serious misunderstandings of psychoanalysis. One wonders where "... it is conventional to ascribe an exclusively oedipal interpretation to the concepts of transference and counter-transference". Thirdly, the assertion is made that "counter-transference" is neglected in psychoanalysis, while in fact it is central. The second half of the book contains valuable substance, but again we must give a warning. Neurotic traits are confused with memories of them that linger after their resolution. Illustrations of the need for an analyst to have been analysed show the degree to which interpersonal analysts intrude their personalities, unacceptable degrees of neuroticism in analysts, and over-simplified stereotyped interpretations. The "ideal analyst" is surprisingly lampooned.

Discriminating readers will glean much from this book; but counter-transference and its delineation from reality-based responses are not defined.

**Xylocaine: The Pharmacological Basis of its Clinical Use.** By Sten Wedling; 1959. Stockholm: Almqvist Wiksell. 8" x 5", pp. 146, with 25 figures and many tables. Price: Sw. kr. 20.

"XYLOCAINE", or as we officially term it, lignocaine, was first marketed in 1948, and is now one of the most widely used local anaesthetics. This has resulted from the safety of the drug, and also from the fact that it is effective both topically on mucous membranes and also for infiltration anaesthesia. There is an extensive literature on "Xylocaine" dealing with a great many aspects of its pharmacology and clinical application, and this book is a selective review of much of this work. Dr. Sten Wedling was one of the pharmacologists responsible for much of the early work on "Xylocaine", and is therefore singularly well qualified to write this book.

Although small and compact, the book comprises some 17 chapters dealing principally with the pharmacological actions of "Xylocaine". After an historical introduction, the chemical and physical properties are discussed, and then follow several interesting chapters on the relationship between the structure of local anaesthetics and their action. The author has compiled information on the local anaesthetic activity of this drug on all the standard test methods used pharmacologically, and has compared this with procaine, which is probably the most widely established synthetic local anaesthetic. These comparisons range over a wide species of animals from mouse to man. The results are discussed, and human observations are used to study the duration of action of "Xylocaine" in comparison with procaine, with adrenaline and alone.

In another chapter the actions of "Xylocaine" on the central nervous system are considered, and it is pointed out that this drug tends to be more sedative and less apt to produce side effects than procaine. The cardiovascular effects are also the subject of comprehensive review, together with the metabolism of the drug and its fate in the body. There is also an extensive chapter on the toxicology of "Xylocaine", and in this the author considers acute toxicity, chronic toxicity and the toxicity to the tissues.



The book is extremely well illustrated with diagrams and tabular material, and there follows a bibliography of all the main references in this field. There is, of course, little reference to the clinical use of "Xylocaine"; but the book provides an excellent reference source for information on this drug. At the same time it is not a dull review or a catalogue of references, but it is quite an interesting and readable account of one of the drugs which has come into very widespread use of recent years.

**Principles of Disability Evaluation.** By Wilmer Cauthorn Smith, M.D.; 1959. Philadelphia and Montreal: J. B. Lippincott Company. Sydney: Angus and Robertson, Limited. 9" x 5½", pp. 224. Price: 77s.

THIS is a compact volume of 200 pages which contains a wealth of valuable information. The author is a man of great experience in his field, and has attempted to set standards of evaluation of disability which will be suitable to all assessors in spite of variations in workers' compensation laws from State to State in the United States of America, and from country to country in different parts of the world; he has succeeded very well. Our only adverse comment would be that there is much reiteration which becomes rather tiresome.

The author has divided the book into four sections. (i) The introduction deals with the principles of disability evaluation, and the doctor's relationship to the workers' compensation laws, as well as giving advice on the writing of reports. This last-mentioned information is an excellent guide for any member of the medical profession. (ii) In the section on the nature of disability, there are chapters on relationship between cause and effect, a definition of permanent disability and the problems of predicting the future of disability. All are useful. (iii) The third section is on relationship—the relating of cause to effect in disability. Evaluation in terms of altered physiology and pathology with the many extraneous factors that disturb our reasoning is always difficult, and it would appear that the author also has many problems which are yet unsolved. This section is less rewarding than the other three sections. (iv) The final section, on evaluation of disability, deals with the detailed evaluation of the various anatomical regions of the body, and should be a helpful guide to members of the medical profession, as well as to insurance and legal personnel who engage in workers' compensation evaluation.

This should prove an excellent reference book.

**The Etiology and Arrest of Pre-Eclamptic Toxæmia: With Early Ambulant Treatment.** By K. Douglas Salzmann, M.D., M.R.C.P. (Edinburgh), D.Obst., R.C.O.G.; 1960. London: H. K. Lewis and Co. Limited. 8½" x 5½", pp. 78. Price: 10s. 6d.

THE wording of the title of this excellent little book suggests that patients being treated for toxæmia of pregnancy are allowed out of bed at an early stage of their treatment; but the author really wishes to stress that ambulatory treatment of the toxæmias should be commenced at the first indication of their presence, thus avoiding the need for hospital treatment later on.

The first section of the book deals with the aetiology of pre-eclampsia and eclampsia. The author holds that hormones formed principally by the fetus, and to a less extent by the placenta, cause a stress reaction in the mother, with consequent increased production of cortisone; this, in the presence of adrenaline, cause vasospasm. Later, renal and placental damage causes more serious signs to occur. The author postulates that vasospasm is indicated by an increase in diastolic blood pressure, and that reserpine decreases the diastolic blood pressure and so lessens vasospasm.

The signs of toxæmia, in order of their appearance, are excess weight increase, oedema, increased diastolic pressure, increased systolic pressure, albuminuria, convulsions.

The régime of treatment, which is commenced when the diastolic pressure reaches 84 mm. of mercury, consists of weight control, reduction of carbohydrate in the diet and the exhibition of reserpine, from that time until the end of the pregnancy, without putting the patient to bed. Anorexic drugs may also be used. Bed rest and admission to hospital are reserved for the very few patients who do not respond to this treatment. By this method the author has reduced the necessity for ante-natal beds, the incidence of pre-eclampsia, the rate of induction of labour and the perinatal death rate.

Similar results have been achieved in this country by dieting and weight control without exhibition of reserpine;

but all who practise obstetrics are urged to read this book, for they will surely profit by it. It is the story of a conscientious and successful campaign against the toxæmias of pregnancy. One warning is necessary: reserpine, in daily doses of a milligramme or more, may cause severe mental depression with suicidal tendencies.

**Understanding Psycho-Sexual Development: Designed to Assist Clergy, Social Workers, Teachers, etc. Oriented Toward Counselling.** 1960. Sydney, Melbourne, Brisbane, Adelaide: Father and Son Welfare Movement of Australia. 8½" x 5½", pp. 56. Price not stated.

A SERIES of eight lectures delivered to Protestant clergy is here contained in a pamphlet issued by the Father and Son Welfare Movement. The lectures are designed to assist social workers and clergy in counselling, especially marriage counselling. The coverage of the subjects is naturally far from complete, but extensive bibliographies are supplied with each chapter.

The subjects include psycho-sexual development in childhood and adolescence, both normal and abnormal, and the art of counselling in general and pre-marital counselling in particular. Counselling is differentiated from instruction, as being a process whereby the individual is helped to understand himself, his attitudes to life problems and his possible reactions to situations in marriage. Counselling is advocated for all contemplating marriage, but especially when there are personality differences or hostility towards parents. A panel of psychiatrists and counsellors have combined their knowledge, and all agree that the commonest problem in marriage is emotional immaturity—that is, fixation of the emotions at an inappropriate level—and that housing, finance, in-laws, etc., are secondary problems usually adequately dealt with by emotionally mature partners.

The case for chastity is well put. In addition to the fears of conception, infection and detection (which these days are becoming less alarming), the wisdom rather than the morality of the question is discussed on the grounds of psychological damage, social disapproval and the tendency to habit-formation or obsessive sexual behaviour. A final chapter deals with some major psycho-sexual problems. These, it is stressed, are to be referred to specialists.

As a guide for doctors interested in counselling this book is splendid, and will be a useful refresher for those whose undergraduate psychiatric training was scanty. A religious bias naturally exists in these lectures, but this is not allowed to overshadow the generally scientific and practical approach.

**Work and the Heart: Transactions of the First Wisconsin Conference on Work and the Heart.** Edited by Francis F. Rosenbaum, M.D., and Elston L. Belknap, M.D.; 1959. New York: Paul B. Hoeber, Inc. 10½" x 7", pp. 560, with many illustrations and tables. Price: \$12.00.

THIS book is a valuable account of the proceedings of a large conference sponsored by the Marquette University Medical School and the Wisconsin Heart Association. The organization considered that, prior to the conference, current knowledge of the effects of work, exercise and stress upon the normal and the diseased heart was "inadequate, confused and contradictory", citing as an example the varying opinions of medical experts in the compensation courts. The conference was divided into five panels concerned with basic physiology, clinical physiology, pathology, work classification and workmen's compensation. About fourteen participants, including some from outside America, constituted each panel. This book reports in full the formal presentation of each speaker, the summaries of each moderator, and the discussions at the final plenary session. Descriptions are given of the basic physical and clinical phenomena associated with cardiac contraction, the influence of environment on the work load, the effects of strenuous athletic competition and the demands of ordinary factory employment. There was considerable discussion of the mechanisms causing coronary thrombosis occurring during stress, and gratifying results were reported from the work-classification units where patients are fully evaluated prior to their return to productive employment. The discussion on compensation laws referred to United States statutes and were only partly applicable to Australian jurisdiction. The Conference closed with many questions unanswered or only partly so, and many new aspects of these problems were brought to light. No doubt a considerable stimulus to further inquiry resulted, and further meetings will be arranged in the future.

The proceedings are well illustrated, and form a model for this type of medical reporting. Each author's references are given in full, and the reader is at a vantage point as good as, or better than, that of those present at the conference. The section on basic physiology, for example, is a complete monograph in itself. It is impossible in this brief review to give any detailed results of these discussions; but it can be stated with confidence that there is a vast amount of information offered, some of which has not yet appeared elsewhere, and no physiologist, cardiologist, industrial physician or expert medical witness would fail to find many items of interest and value in the report. The whole concept and its careful editing are to be warmly commended. It was not to be expected that many problems would be solved or many fundamental questions given a final answer; but the policy of setting up a small but expert group, given unlimited time for discussion under a good moderator and opportunity for cross-discussions with specialists in neighbouring fields, plus a final plenary session, constitutes a good pointer for the betterment of large international congresses. Buried in many words can be found the beginnings of new concepts and approaches, which may make this conference one of historical importance.

**The Effect of Pharmacologic Agents on the Nervous System.** Research Publications, Association for Research in Nervous and Mental Disease, Volume 37; edited by Francis J. Braceland, M.D.; 1959. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 5½", pp. 502, with 124 illustrations and 34 tables. Price: £7 8s. 6d.

THE number of books and journals devoted to psychopharmacology increases almost daily, and this book gives an account of the 1957 proceedings of the Association for Research in Nervous and Mental Disease. It comprises some 26 chapters from a variety of authors and covers a variety of topics. In accordance with the American practice, each chapter or contribution is presented in the form of a discussion, which can sometimes be particularly useful to a worker in that particular field. Most chapters are well documented, and perhaps the real value in a book of this kind is in the fact that it gives general accounts of the particular field of research and the main sources of further information.

The following topics are among those dealt with: the use of drugs in central nervous diseases and infections; the pharmacology of anticonvulsants and their clinical considerations; methods of evaluating drugs on animal behaviour and also on the human subject; placebos, which most people recognize nowadays to be by no means free from pharmacological activity. (This is a very interesting chapter.) There are discussions on metabolic defects of the central nervous system, tranquillizer drugs, sedatives, hypnotics, narcotics and stimulants, to mention a few more of the topics included.

Some of the chapters make very interesting reading to a worker not intimately engaged in this field; but most of them of necessity are technical, as they are intended to report on recent progress in research for the benefit of other workers.

**Bronchography.** By C. Dijkstra, M.D.; 1959. Oxford: Blackwell Scientific Publications. 9½" x 6½", pp. 158, with 106 illustrations. Price: 45s. (English).

DR. C. DIJKSTRA, who previously produced an "Atlas of Bronchial Lesions in Pulmonary Tuberculosis", has now published a monograph on bronchography, which is intended to be a simple manual dealing with the technique as well as the interpretation of the results obtained by this method of investigation. It is surprising that in a manual avowedly intended rather for the internist and radiologist than for the full time chest physician, the technique of bronchography should be dismissed in the space of two pages, and that insertion of the catheter under fluoroscopic control should be advised; most will agree that this is unnecessary, and involves both patient and operator in two unwarranted radiation hazards. There also seems little justification for a special table, which the author advises. One further criticism of this section is that the author does not use the international nomenclature for the naming of the branches of the bronchial tree, and whereas he recommends a "Lipiodol"-sulphonamide mixture as the medium of choice, most operators now prefer oily or aqueous "Dionosyl".

The bronchial changes studied are divided into five sections: changes due to foreign bodies, malignant tumours, granulomatous inflammatory lesions (tuberculosis, silicosis,

sarcoidosis), changes occurring in asthma and bronchitis and finally changes seen in bronchiectasis. Each section except that on foreign bodies opens with a brief general description and is followed by a number of illustrative cases. These are well chosen, but inclined to be too detailed for the purpose, and so become rather tedious to the reader. However, the bronchograms are well chosen to demonstrate the points made by the author, and the reproductions are excellent. In fact, it is these which make the book well worth while, and a useful manual for both radiologist and chest physician.

**Medical Helminthology.** By J. M. Watson, D.Sc. (London), A.R.C.S.; 1960. London: Baillière, Tindall and Cox. 9½" x 7½", pp. 490, with illustrations. Price: 84s. (English).

THE author is known for his publications on helminthological subjects, notably those on chemotherapeutic investigations in relation to the control of bilharziasis in the Middle East. In a book designed to meet the needs of a wide range of persons whose work entails a knowledge of parasitic worms, he has succeeded in compressing into relatively small compass a comprehensive account of his subject in its varied aspects. He even hopes to interest that hypothetical character, "the informed and progressive citizen of the world".

The book is divided into three parts, of which the first consists of eleven chapters devoted to general topics presenting the parasitic worms in the framework of general invertebrate zoology, in a manner that lends interest to the subject and will appeal to some of the general readers he hopes to reach. It is unfortunate that the chapter on world distribution of worm infections is marred by the inclusion of some misleading maps. New Guinea and the Solomon Islands are credited with a generous incidence of *Paragonimus* on the strength of one reported case. *Wuchereria malayi* has a series of dots scattered over the whole of New Guinea where it has never been recorded, while the Malay Peninsula, where it occurs, is left immaculate.

The second part forms the main body of the work, and gives a systematic account of the parasitic worms of man; for convenience it groups them according to their habitat in the definitive host rather than to their zoological affinities.

The third part deals with the clinical and public health aspects of the subject, and finally there follows a series of useful appendices. The last of these, "Recent Advances", makes good some of the deficiencies otherwise inevitable in a book that has been several years in preparation.

The volume is well printed and copiously illustrated with drawings, many original. While it is a pleasure to see these replacing some of the much-reproduced favourites, it must be said that a few of them are lacking in clarity and could be misleading. Also, the rather confusing subject of the vectors of *Wuchereria bancrofti* is not rendered any less so by the author's treatment. However, these and other defects, which will no doubt be remedied in later editions, do not substantially detract from the value of the book as a teaching aid, and it can be warmly recommended.

**The Essentials of Roentgen Interpretation.** By L. W. Paul, M.D., and J. H. Juhl, M.D.; 1959. New York: Paul B. Hoeber Inc. 10½" x 7½", pp. 856, with 1203 illustrations. Price: \$25.00.

THIS publication, being as it is a work midway between the books of an elementary character and those of great detail and complexity, should be of value both to the student and, for quick reference, to the practising radiologist. The subject matter is not dealt with in great detail, but the basic and essential points are dealt with.

The main fault that can be found with this book is that its arrangement and classification leave much to be desired. Some conditions are dealt with, the consideration being their relation to anatomical structures, whereas others of a similar category are described mainly from their pathological significance.

Some reference is made to radiological anatomy, and this is always of great value. A good section describes living bone, which is a most necessary concept in the study of present-day radiological diagnostic procedures.

The anomalies and dysplasias of bone are grouped, and reach a very large number; our only criticism of this section is that they are rather cursorily described and rapidly passed over. This also applies to the discussion

of traumatic bone lesions. Some of the special examinations, particularly with regard to procedure and technique, lack just that added amount of description which would greatly increase the value of this book as one of reference. The illustrations are very good, and the legends and descriptions satisfactory and comprehensive.

To sum up, this publication is extremely comprehensive in its field; but we think that the subject matter could be better classified and arranged, and could be dealt with in greater detail. However, the book would make a valuable addition to any library.

**Biochemical Values in Clinical Medicine: The Results Following Pathological or Physiological Change.** By Robert Duncan Eastham, B.A. (Cantab.), M.D. (Cantab.), D.C.O., Dipl. Path.; 1960. Bristol: John Wright & Sons, Limited. 7" x 4", pp. 148. Price: 15s. (English).

This is a small, pocket-size, soft-covered, quick-reference booklet, which could serve a very useful purpose by being in the hands, or on the shelves, of all who order biochemical tests and all who must interpret the results, "because I have found in clinical laboratory practice that junior medical staff tend to read too much or too little into the results returning to them from the laboratory". It contains nothing which is not to be found in other larger books or journals, its main virtues being judicious selection and compact collection of concise, thumb-nail descriptions of the physiological basis for each test, the normal values, and the most important physiological and pathological causes of abnormal results. Pertinent references are given. More than 160 tests are dealt with in alphabetical order in its 140 pages, with a good index—amylase, aldosterone excretion, duodenal intubation, faecal fat, serum sodium, gluten tolerance test and so on—all the common tests and none of the outmoded tests; and those tests which are uncommon are at least topical or of occasional or growing importance. The author is a British consulting pathologist, and his purpose in compiling the book has been fulfilled—"to provide an accurate summary of the ways in which various conditions affect many biochemical tests".

**Brucella Infection and Undulant Fever in Man.** By Sir Weldon Dalrymple-Champneys, Bt., C.B., D.M., D.P.H., F.R.C.S.; 1960. London, New York, Toronto: Oxford University Press. 8½" x 5½", pp. 210, with illustrations. Price not stated.

This excellent monograph on a most interesting and world-wide disease presents the considered conclusions of a physician and public health officer who has made a special study of the subject since 1928. At that time undulant fever was regarded in Great Britain as practically an exotic disease, only 14 cases of endemic infection having been recognized up till August, 1929, when the author published his first report on it to the Ministry of Health. Since that time, Sir Weldon Dalrymple-Champneys has acted as the Ministry's consultant on brucella infection in man, and this work is based on 1500 cases of the disease seen by him over a period of thirty years, which includes the dawn of the present era of chemical and antibiotic therapy. He is now chairman of the Joint FAO/WHO Expert Committee on "brucellosis" (a term he deprecates), so that he is well acquainted with the problems and implications of the infection, not only in the human inhabitants of the British Isles, but also as a zoonosis throughout the world.

The layout of the book follows orthodox lines. It begins with an interesting chapter on the historical aspects, and describes the converging of lines of investigation which showed that the causal organisms of the human fever prevalent for centuries in the Mediterranean basin, of many human fevers elsewhere, and of unthriftiness, sickness and epidemic abortion in goats, cattle, sheep and swine, to say nothing of poll evil in horses and epizootics in certain wild animals, are generically identical.

The important fact is emphasized that, although human infection everywhere is dependent on the continuing existence of animal reservoirs, yet the clinical and epidemiological character of the disease varies considerably in different countries.

Many contentious points and problems are raised in the following chapters, which cover the epidemiology, clinical features, diagnosis, prevention, treatment and prognosis; the arguments are critically presented, the reader in many cases being left to weigh the evidence for himself. To assist him in this task there is an extensive list of 385

references in several languages, with an index of the authors referred to and a useful subject index.

The last chapter of the text deals with the future; it is brief and by no means pessimistic, but the final sentence sounds a warning to our profession, reminding its members of the need for accurate diagnosis followed by full and effective treatment. Throughout the book runs a thread of biological philosophy, which is exemplified by the contention that treatment should be aimed to establish a "comfortable symbiosis" between host and parasite, rather than to eradicate the infection.

**Bonding of Fractures by Plastic Adhesives: With Further Applications in a Research Project.** By Bernard Bloch, M.B., Ch.B. (Rand.), F.R.C.S. (Eng.); 1959. Sydney. Angus & Robertson, Limited. 9½" x 7", pp. 24, with 24 illustrations. Price not stated.

THIS is a very short monograph of the work which has been done at the Prince of Wales Surgical Research Centre over the last three years. The subject is well introduced, and details of the chemical formulæ of the epoxy resins and the catalytic agents or amines are well presented. Also the glues themselves, with their detailed formulæ, are listed. It is interesting to see that these formulæ are patented under the *Patents Act* of the Commonwealth of Australia. The presentation of the research projects and the description of the technique used in human cases are sketchy. The impression received is that the author wishes to establish a precedent in this technique, rather than to present lengthy clinical details. There are pictures of human patients whose fractures have been treated with the glue reinforced by a matrix of fibreglass thread and cloth. It appears that this technique has failed, perhaps because ambulation has been commenced early without due regard to the establishment of normal bony union. This result is reminiscent of some of the early failures in the management of fractures of the neck of the femur with the Smith-Petersen nail. Enthusiasts began weight-bearing, relying on the nail, and failure was inevitable. The monograph finishes on a hopeful note that research will reveal a biologically and mechanically adaptable resin which can be applied direct to bone ends, gluing them together, yet allowing normal union to take place.

**Fluoridation: Errors and Omissions in Experimental Trials.** By Philip R. N. Sutton, D.D.Sc. (Melb.), L.D.S. (Vic.); 1959. Carlton: Melbourne University Press. 8½" x 5½", pp. 96, with illustrations. Price: 8s. 6d.

EXTENSIVE reviews of this work are given in the *New Zealand Dental Journal* (Vol 56, page 35) and in an editorial of the *Australian Dental Journal* (Vol. 5, page 39), and the interested reader will do well to study them as well as Sutton's monograph. It appears to us (i) that epidemiological methods have established that the incidence of caries is lower where there is natural fluoride in the water supply, (ii) that fluoride can be safely added to water supplies in the required proportions and (iii) that the trials carried out have tended to show that the addition of fluoride to the water supply is successful in reducing caries. In view of the difficulties attending large-scale trials in the field, it is not surprising that these trials can be criticized. Sutton has dealt rather unfairly with his authorities, using minor arithmetical errors to discredit some work, and on the other hand giving high praise, such as the title of "eminent", to authors agreeing with his own thesis. We can only hope that this book does not delay the coming of fluoridation of water supplies, as recommended by the National Health and Medical Research Council of Australia.

**The Treatment of Bronchial Neoplasms.** By R. R. Shaw, M.D., and D. L. Paulson, M.D.; 1959. Oxford: Blackwell Scientific Publications Ltd. Springfield: Charles C. Thomas. 10" x 6½", pp. 150, with illustrations. Price: 64s. (English).

THIS is an excellent presentation by two American thoracic surgeons with a combined experience of 1215 patients suffering from bronchial neoplasms. In addition, they give a lucid and balanced account of other views of concern to the clinician. If any possible criticism can be offered, it does not concern the scientific content of this monograph, but the literary style. Although the book is well arranged and clearly presented, one is conscious of a ponderous quality due to the use of elaborate words and phrases in place of simple and direct expressions.

The chapter called "Terminal Care" is particularly good. The authors discuss the psychological and physical



difficulties experienced by the patient with advanced cancer of the lung with a wisdom and humanity that are impressive.

After reading this book, we feel that there will not be very much more to say about this subject until some fundamentally new discovery is made.

**Essentials of Healthier Living: A Realistic College Text in Person and Community Health.** By J. J. Schifferes, Ph.D.; 1960. London: John Wiley & Sons, Inc. 9½" x 7", pp. 350, with many illustrations. Price: \$5.50.

This beautifully illustrated, colourfully presented and, to our mind, essentially popular book is, amazingly, a college text. Written by a specialist "health educator", it is intended for American college students, to instruct them in personal and community health, and it is as readable and easily understood as the medical articles in our women's magazines. It is something of a shock to find the information contained here to be up to date, pertinent and valuable, covering many fields from marriage and reproduction to mental health.

This is actually a revised, shorter edition of the author's "Healthier Living", published in 1954, the main deletions being the profounder aspects of mental mechanisms, medical diagnosis and treatment, and history of science.

Dr. Schifferes delves freely into literature and history for illustration and, addressing his college students, makes the text a very convincing appeal for wholeness of body and mind throughout, incorporating much sound advice into the general pattern of instruction. The numerous diagrams and pictures are excellent, and the book, very different from our own conception of a textbook, is the kind of thing a family doctor might recommend to his patients. Indeed, it is the best thing of its kind that we have ever read.

### Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Medical Physics", edited by Otto Glasser, Ph.D., Volume 3; 1960. Illinois: The Year Book Publishers Inc., Melbourne: W. Ramsay (Surgical) Limited. 10½" x 7½", pp. 814, with illustrations.

"Miscellaneous Notes (Sixth Series)", by F. Parkes Weber, M.D., F.R.C.P., F.S.A.; 1960. London: H. K. Lewis and Co. Ltd. 7½" x 5½", pp. 10. Price: 3s. (English).

"The Development of the Infant and Young Child: Normal and Abnormal", by R. S. Illingworth, M.D., Leeds, F.R.C.P., D.P.H., D.C.H.; 1960. Edinburgh and London: E. & S. Livingstone Ltd. 8½" x 5½", pp. 326, with 95 illustrations. Price: 27s. 6d. (English).

"First Aid: Diagnosis and Management", by Warren H. Cole and Charles B. Puestow; Fifth Edition; 1960. New York: Appleton-Century-Crofts Inc. 8½" x 5½", pp. 432, with illustrations. Price not stated.

"The Organization of Psychiatric Care and Psychiatric Research in the Union of Soviet Socialist Republics". *Annals of the New York Academy of Sciences*, Volume 84, by Nathan S. Kline; 1960. New York: New York Academy of Sciences. 9" x 6", pp. 74, with illustrations. Price: \$3.00.

"Synopsis of Ophthalmology", by William H. Havener, B.A., M.D., M.S.; 1959. St. Louis: The C. V. Mosby Company, Melbourne: W. Ramsay (Surgical) Limited. 7½" x 4½", pp. 238, with 189 illustrations. Price: £3 14s. 3d.

"The Medical Clinics of North America", Volume 44, Number 2; 1960. "Lahey Clinic Number: Endocrine and Metabolic Diseases and Use and Abuse of Corticosteroid Therapy". Philadelphia and London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Limited. 9" x 5½", pp. 604, with illustrations. Price: Cloth binding: £8 2s. 6d. Paper binding: £6 15s. 0d.

"The Year Book of General Surgery (1959-1960 Year Book Series)", edited by Michael E. De Bakey, B.S., M.D., M.S., 1959. Chicago: The Year Book Publishers Inc. Melbourne: W. Ramsay (Surgical) Limited. 7½" x 5", pp. 640, with illustrations. Price: £4 8s. 0d.

"The Year Book of Obstetrics and Gynecology (1959-1960 Year Book Series)", edited by J. P. Greenhill, B.S., M.D., F.A.C.S., F.I.C.S. (Honorary); 1959. Chicago: The Year Book Publishers Inc. Melbourne: W. Ramsay (Surgical) Limited. 7½" x 5", pp. 574, with illustrations. Price: £4 8s. 0d.

"The Year Book of Pediatrics (1959-1960 Year Book Series)", edited by Sydney S. Gellis, M.D.; 1959. Chicago: The Year Book Publishers Inc. Melbourne: W. Ramsay (Surgical) Limited. 7½" x 5", pp. 494, with illustrations. Price: £4 8s. 0d.

"Synopsis of Gynecology", by Robert James Crossen, M.D., Daniel Winston Beacham, M.D., and Woodard Davis Beecham, M.D.; Fifth Edition; 1959. St. Louis: The C. V. Mosby Company, Melbourne: W. Ramsay (Surgical) Limited. 7½" x 4½", pp. 340, with illustrations. Price: £3 11s. 6d.

"A Primer of Medicine: Being an Introduction to Clinical Neurology, Alimentary, Respiratory and Cardiovascular Diseases", by M. H. Pappworth, M.D., M.R.C.P.; 1960. London: Butterworth & Co. Ltd. 8½" x 5½", pp. 260. Price: 46s. 6d.

"The Year Book of Neurology, Psychiatry and Neurosurgery", (1959-1960 Year Book Series), "Neurology", edited by Roland P. Mackay, M.D., "Psychiatry", edited by S. Bernard Wortis, M.D., "Neurosurgery", edited by Oscar Sugar, M.D.; 1960. Chicago: The Year Book Publishers. Melbourne: Ramsay's Medical Books. 7½" x 5", pp. 640 with many illustrations. Price: £4 19s.

"Surgical Gastroenterology: Considerations Based on Pathologic Physiology", by Warner F. Bowers, A.B., B.Sc., M.D., M.Sc., Ph.D. (Surg.); 1960. Springfield, Illinois: Charles C. Thomas, Oxford: Blackwell Scientific Publications Ltd. 10" x 6½", pp. 516 with many illustrations. Price: £7 8s. (English).

"Medical, Surgical, and Gynecological Complications of Pregnancy", by The Staff of the Mount Sinai Hospital and edited by Alan F. Guttmacher, M.D., and Joseph J. Rovinsky, M.D.; 1960. Baltimore: The Williams & Wilkins Company. 10" x 6½", pp. 632 with many illustrations. Price: £9 1s. 6d.

"Staining Procedures: Used by the Biological Stain Commission", revised by H. J. Conn, Mary A. Darrow and Victor M. Emmel with the assistance of H. A. Davenport, Georgia Gwinner, B. P. Kaufmann, S. I. Kornhauser, J. B. Longley, R. D. Lillie, Charlotte Pratt and Frank H. Smith; 1960. Baltimore: The Williams and Wilkins Company. 9" x 5½", pp. 304. Price: 55s.

"The Cerebral Cortex", translated from the French and German by Gerhardt von Bonin; 1960. Springfield, Illinois: Charles C. Thomas and Oxford: Blackwell Scientific Publications Ltd. 9" x 6", pp. 420. Price: 92s. (English).

"The Federal and Provincial Health Services in Canada", edited by R. D. Defries, C.B.E., M.D., D.P.H., LL.D., Dr.P.H.; 1959. Toronto: Canadian Public Health Association. 10" x 6½", pp. 160. Price: Not stated.

"The Photography of Patients: Including Discussions of Basic Photographic and Optical Principles and Infrared Techniques", by H. Lou Gibson, F.B.P.A., F.P.S.A.; Second Edition, 1960. Springfield, Illinois: Charles C. Thomas, Oxford: Blackwell Scientific Publications Ltd. 8½" x 7½", pp. 212. Price: 84s. (English).

"The Jubilee Book of the Sydney Hospital Clinical School", by E. H. Stokes, M.D., Ch.M., F.R.A.C.P.; 1960. Sydney: Angus and Robertson. 8½" x 5½", with 18 illustrations. Price: Not stated.

"A Primer of Electrocardiography", by George E. Burch, M.D., F.A.C.F., and Travis Winsor, M.D., F.A.C.P., Fourth Edition, 1960. Philadelphia: Lea and Febiger. 9½" x 5½", pp. 204, with 286 illustrations. Price: 55s.

"Textbook of Otolaryngology", by David D. DeWeese, M.D., and William H. Saunders, M.D., 1960. St. Louis: The C. V. Mosby Co. Melbourne: W. Ramsay (Surgical) Limited. 9½" x 6½", pp. 464, with 354 illustrations. Price: £4 16s. 3d.

"Physiology of the Eye: Clinical Application", by Francis Heed Adler, M.A., M.D., F.A.C.S.; Third Edition; 1959. St. Louis: The C. V. Mosby Company, Melbourne: W. Ramsay (Surgical) Limited. 9½" x 6½", pp. 790, with 372 illustrations. Price: £8 16s. 0d.

"Pediatric Dermatology", by Henry H. Perlman, M.D., Ph.D.; 1960. Chicago: The Year Book Publishers Inc. Melbourne: W. Ramsay (Surgical) Limited. 10½" x 7", pp. 490, with many illustrations. Price: £9 18s.

"Anatomy: A Regional Study of Human Structure", by Ernest Gardner, M.D., Donald J. Gray, Ph.D., and Ronan O'Rahilly, M.Sc., M.D.; 1960. Philadelphia, London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Limited. 10" x 7", 1016 pages, with many illustrations. Price: £7 10s.

"The Surgical Clinics of North America", Volume 40, Number 1; February, 1960. "Peripheral Vascular Diseases", edited by Ormand C. Julian, M.D., Philadelphia and London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Limited. 9" x 5½", pp. 266, with many illustrations. Price: Paper binding: £6 15s. 0d. per annum. Cloth binding: £8 2s. 6d. per annum.

"Pediatric Clinics of North America", Volume 7, Number 1; 1960. "Symposium on Adolescence", edited by Lyman T. Melks, M.D., Philadelphia and London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Limited. 9" x 6", pp. 240, with illustrations. Price: £6 15s. per annum.

"Bibliographical Citation", by Cyril C. Barnard; Second edition; 1960. London: James Clarke and Co. Ltd. 8½" x 5½", pp. 20. Price: 2s. 6d. (English).

## The Medical Journal of Australia

SATURDAY, AUGUST 13, 1960.

### CARCINOMA OF THE LUNG.

"CARCINOMA OF THE LUNG has become the most frequent of all cancers. Vital statistics from the Commonwealth of Massachusetts show that, in 1950, carcinoma of the lung ranked second only to cancer of the breast. In 1955 its incidence exceeded that of cancer of the breast. It increased from 3.08 per 100,000 population in 1930 to 42.16 per 100,000 population in 1955. In the United States, in 1930, there were 2500 deaths from cancer of the lungs. In 1950 there were 18,000 deaths; in 1956, 29,000." So states Alton Ochsner<sup>1</sup> in an article reviewing the present position of cancer of the lungs and the relation of cigarette smoking to its incidence. He traces the rise in cancer incidence to a heavy increase in cigarette smoking with a twenty-year lag period, dating from the early years of World War I. Some of his statistics are striking. In 1920, cancer of the lungs represented 1.1% of all cancers in the U.S.A.; in 1930, the figure was 2.2%; in 1956, it was 10%. In New York State, between 1931 and 1950, the incidence of lung cancer in men increased by 385%, while that of all other cancers in men increased by only 2%. In England, from 1920 to 1954, a 38-fold increase occurred in the incidence of lung cancer. In Holland, Austria and Italy there were similar increases. Ochsner goes on to point out that the incidence of bronchogenic cancer increases sharply to reach a peak at the age of 55 years, decreasing with advancing years; it thus differs from most other cancers, which increase in incidence with increasing age right up to the nineties. He correlates this fact with a decrease in the number of cigarettes smoked with advancing years. Persons who have been heavy smokers of cigarettes have subjected their hearts and blood-vessels to the deleterious effects of tobacco; coronary thrombosis has developed in many of these, and they have not lived long enough to be afflicted with lung cancer. "Thus the dubious advantage of smoking is that one can spare himself death from cancer of the lung by smoking heavily and dying early of coronary disease. Without doubt, it is a form of suicide . . ."

Ochsner admits that the earlier claims of a causal relation between smoking and lung cancer were statistically unsound because of lack of the right kind of data, but claims that there is ample evidence now of such a

relationship. About seven years ago the American Cancer Society undertook an investigation of 200,000 men between the ages of 50 and 70 years. Elaborate questionnaires concerning their smoking habits were filled up. Each year for the next six years the men still alive were again interviewed. In this period 12,000 men had died. In the non-smoking group the number of deaths from cancer of the lungs per 100,000 population was 3.4; among those who smoked cigarettes it was 78.6, among those who smoked cigars 11.4, and among those who smoked pipes 28.9. There was also a very marked relationship between the amount smoked and the cancer death rate. A similar study of 200,000 men made by the Veterans Administration showed much the same findings. The study made in England by Richard Doll and A. Bradford Hill among medical men again produced results that were much the same: the death rate per 100,000 was for the non-smoker 7, for the pipe smoker 38, for the pipe and cigarette smoker 68, and for the cigarette smoker 125. The study of Doll and Hill went a step further than the other investigations and showed that if one stopped smoking, the chances of developing cancer of the lungs were less. The rates per 100,000 were: for the non-smoker 7, for those who continued smoking 103, for those who had discontinued smoking for less than 10 years 69, and for those who had discontinued for more than 10 years 35. Further to this, during the past few years several investigators have demonstrated pathological changes in the tracheo-bronchial mucosa which varied according to the amount and duration of the subject's smoking, and which could be precancerous.

The tremendous extent to which smoking is established in America is seen in a study made a few years ago by the American Cancer Society. It was found that 42% of men aged from 50 to 54 years smoked a pack or more of cigarettes a day. Among teenagers of 13 to 15 years inclusive, 37% smoked; among those aged 16 to 19 years inclusive, 67% smoked. Another side of the story is shown by Ochsner's statement that the American tobacco industry pays taxes to the amount of two and three-quarter billion dollars per year. This represents an awful lot of cigarettes.

Ochsner has reviewed certain aspects of lung cancer seen in his clinic at Tulane University, New Orleans, U.S.A. A total of 1453 cases were studied. He points out that carcinoma of the lung is essentially a disease of men (in this group, 8.2 men to 1 woman). It is primarily a disease of the higher age group (68% of those affected were aged between 50 and 70 years). It affects each lung with about the same frequency, but occurs mostly in the upper lobe (60% in this series). Adenocarcinoma offers a poor prognosis, undifferentiated carcinoma a somewhat better outlook, and epidermoid cancer the best prognosis. Diagnosis is generally delayed because the clinical manifestations are indefinite. Anything like atypical pneumonitis should suggest the need for immediate investigation. Any unexplained thoracic discomfort, particularly in a smoker, should be looked on with suspicion. Ochsner suggests that the diagnosis is not difficult if one considers its possibility. It is best made by means of X-ray examination, but bronchoscopy is often useful. Treatment consists of pneumonectomy to a greater or less extent. Unfortunately, the results of operation are not good; only 8.5% of the

<sup>1</sup> J. Amer. Geriatrics Soc., 1960, 8: 159 (March).

patients in this series were alive after five years. This was mainly because the disease was diagnosed too late. Ochsner asks how the outlook can be improved, and suggests two ways: "One is for the physician to suspect cancer of the lung in the case of every obscure lesion of the lung that does not respond to therapy. The other is for persons who smoke to have a roentgenogram taken every six months, preferably every three months, so that when cancer develops it can be detected while it is still curable." One cannot help thinking that if a smoker believed in the association of smoking and lung cancer enough to be ready to accept the last-mentioned routine, he would probably be stimulated to give up smoking anyway.

Ochsner's paper may be placed beside an official statement of the United States Public Health Service<sup>2</sup> prepared by the Surgeon-General, Leroy E. Burnie. Referring to a statement which he issued in 1958, Burnie quotes his own comment "... The Public Health Service feels the weight of the evidence is increasingly pointing in one direction: that excessive smoking is one of the causative factors in lung cancer." That belief, he states, was based on reports that had been accumulating for more than thirty years. Now he sets out to review data in publications which have appeared since 1957, and which the Public Health Service has felt to be of particular value, and to give their interpretation of the material presented. Papers for and against the smoking hypothesis are reviewed as well as those dealing with other factors suspected of being involved in the causation of lung cancer. This is followed by a consideration of certain aspects of pathogenesis, especially in relation to experimental investigation, and possibilities for prevention so far as present knowledge can help us in this regard. Seven conclusions sum up the official view: (i) The weight of evidence at present implicates smoking as the principal aetiological factor in the increased incidence of lung cancer. (ii) Cigarette smoking particularly is associated with an increased chance of developing lung cancer. (iii) Stopping cigarette smoking even after long exposure is beneficial. (iv) No method of treating tobacco or filtering the smoke has been demonstrated to be effective in materially reducing or eliminating the hazard of lung cancer. (v) The non-smoker has a lower incidence of lung cancer than the smoker in all control studies, whether analysed in terms of rural areas, urban regions, industrial occupations or sex. (vi) Persons who have never smoked at all (cigarettes, cigars or pipes) have the best chance of escaping lung cancer. (vii) Unless the use of tobacco can be made safe, the individual person's risk of lung cancer can best be reduced by the elimination of smoking.

However one looks at this question of lung cancer, it is obviously of major significance in modern medicine. It is not surprising therefore to note that it is being tackled on the international level through the World Health Organization. In November, 1959, a Study Group on Epidemiology of Cancer of the Lung met in Geneva under the chairmanship of Dr. Richard Doll, and a report<sup>3</sup>

from the group has now been issued. Referring to the steady increase in age-adjusted mortality from cancer of the lung which has been appearing in official statistics from many different parts of the world for some years, the report states that in some countries, e.g., England and Wales, the increase appears to have started at least forty years ago; in others, such as Chile and Japan, it has been noted only during the last ten to fifteen years. Trends in morbidity data, where available, have been in close agreement with those shown by mortality statistics. Although part of the increase must be ascribed to increased recognition of the disease, it is generally accepted that in many countries the greater part of the increase is real and reflects an increased risk of contracting the disease. The study group reviewed current knowledge regarding aetiological factors and unanimously agreed that there was no reason to modify the conclusions reached by various experts that "the sum total of the evidence available today was most reasonably interpreted as indicating that cigarette smoking is a major causative factor in the increasing incidence of human carcinoma of the lung". Recognizing that this conclusion had not been accepted by all who have studied or written on the subject, the study group still agreed that, while some of the criticism levelled did suggest avenues for further investigation, none could be considered as casting serious doubt on the conclusions reached on the basis of the extensive studies already made. Other factors seem, however, to be of some importance. It was concluded in general terms that air pollution could be a significant factor, but that in many countries its role appeared to be smaller than that of cigarette smoking. Certain specific industrial causes also have been shown to increase the risk of lung cancer amongst those exposed, and there may be other industrial hazards not yet discovered, but the number of cases concerned is small. Other suggested factors, about which the evidence is still insufficient, are ionizing radiations from non-industrial sources, the presence of previous pulmonary disease, particularly if it has resulted in metaplasia and scarring, and heredity.

The study group's report goes on to say that in view of the wide geographical variations in mortality from lung cancer that exist in many parts of the world and of the fact that an increase in mortality from lung cancer can now be observed in several countries where this disease has previously been infrequent, the group believes that high priority should be given to epidemiological investigations designed to throw light on the reasons for these variations, and more especially on the reasons for the increase in incidence in countries where the mortality rate has previously been low. It is regarded as particularly important to determine the extent to which already identified aetiological factors may be responsible for the increase in lung cancer in the latter group of countries. A series of recommendations is set out for study of the matter on an international level. It seems evident that, if these are followed, vital information can be obtained which could not be gathered in any other way, and which may well provide the key to understanding of the problem.

The report concludes with a note on prophylaxis. The study group recognized that its principal concern was to consider desirable avenues of research in the epidemiology

<sup>2</sup>J. Amer. med. Ass., 1959, 171: 1829 (November 28).

<sup>3</sup>"Epidemiology of Cancer of the Lung: Report of a Study Group", World Health Organization, Technical Report Series, No. 192, 1960. Geneva: World Health Organization. 9½" x 6½", pp. 16. Price: 1s. 9d. (English).



of lung cancer, but it has also called attention to the fact that existing knowledge of the etiology of lung cancer "is already sufficiently established to justify prophylactic action aimed at reducing exposure to known aetiological factors". It is quite clear from the report that the "known aetiological factors" in the judgement of the study group are smoking, air pollution and certain specific industrial factors, in that order of priority. The most elementary common sense suggests that these factors should be taken seriously. Both state and civic authorities need to be stimulated into constant vigilance if the threat of increasing air pollution around major centres of population is to be met and overcome. Industrial causes, limited though their effect may be, warrant careful and continued study. As to smoking, Ochsner has commented pungently that "if there were one-tenth the amount of evidence that the Brooklyn Bridge was unsafe for traffic as there is that cancer of the lung is produced by cigarette smoking, the Brooklyn Bridge would be closed within 24 hours to determine whether it was safe or not". Perhaps the last word can be left to an expiring cigarette butt, which has joined the ranks of *The Lancet's* peripatetic correspondents<sup>4</sup> and speaks in remarkably good poetry:

So, here you see me: Cast away  
My brief combustion ended, all my Fire  
In one last plume of Smoke must now expire.  
Others have been before me, said their say,  
Have kissed those self-same Lips this very day  
And gone; his Breath will yet inspire  
A Dozen others like me. Not Desire  
But Mutual Death is in our fleeting Play!

What though he is the Master and 'twas Men  
Created us, the lesser partners in the Game?  
It is too early yet for him, poor Fool, to boast;  
A Hundred Thousand of us may be Ash by then  
But Twenty years from hence it will be all the same—  
And who, I wonder, will have lived to suffer most?

## Current Comment.

### THE THERAPY OF ACTINOMYCOSIS AND NOCARDIOSIS.

In this issue (p. 254) we publish a report by D. E. Smith and J. Benecke of a fatal case of pulmonary nocardiosis, a rare condition whose importance lies in its very high mortality rate, which makes early correct diagnosis a matter of life or death. Elsewhere, J. W. Peabody and J. H. Seabury have recently published<sup>1</sup> a detailed study of the basic differences in therapy between actinomycosis and nocardiosis, based on a considerable experience of the diseases. These authors point out that actinomycosis and nocardiosis are closely related and often clinically indistinguishable, both being characterized by chronic pleuropulmonary involvement (Smith and Benecke's case is exceptional in the fulminating character of the infection), subcutaneous abscesses and multiple draining sinuses. Before the advent of antibiotics, treatment of both diseases followed the same principles, with occasional success in actinomycosis and uniformly bad results in nocardiosis. However, there are essential differences between the two conditions, and these are especially important in the matter of therapy, which Peabody and Seabury simplify into the statement "if one chooses to treat with penicillin all diseases caused by branching, fragmenting, filamentous fungi, then most patients with actinomycosis will recover, while almost all patients with nocardiosis will die". *Actino-*

*myces bovis* is extremely sensitive to penicillin, and Peabody and Seabury recommend this as the treatment of choice for actinomycosis. Sulphonamides, which were responsible for many earlier cures, show a far inferior inhibitory effect. Some strains are highly susceptible to various broad-spectrum antibiotics, and it is probable that some early cases of actinomycosis are cured by random antibiotic therapy without the true diagnosis even having been suspected. On the other hand, *Nocardia asteroides* in nearly every case shows marked penicillin resistance, and though some strains are sensitive to broad-spectrum antibiotics and streptomycin, it is much less likely to be eradicated by indiscriminate administration of antibiotics. Peabody and Seabury suggest that this may explain the growing importance of nocardiosis in contrast to the decreasing frequency of actinomycosis. They regard sulphadiazine as the most important drug in the treatment of nocardiosis, on the basis of in-vitro effectiveness, the results of animal experiments and the fact that its use in clinical nocardiosis has been responsible for practically every clinical recovery. They state that sulphadiazine is probably best combined with whatever drug appears most effective *in vitro*, and that, regardless of the results of sensitivity tests, it should constitute the one essential component of any drug regimen for nocardiosis.

In conclusion, Peabody and Seabury point out that, like tuberculosis, both actinomycosis and nocardiosis are basically chronic diseases, and that a dramatic response to therapy should not be expected. In both diseases the earlier treatment is instituted the greater the chance for cure, and chemotherapy in high dosage must be continued for long periods if relapse is to be prevented.

### SEROTONIN, BANANAS AND DIARRHOEA.

A SOMEWHAT detailed account of the possible functions of serotonin (5-hydroxytryptamine) in the human body was given in these columns last year.<sup>1</sup> The concluding sentence was: "The present position regarding serotonin is that we have a very interesting substance, potentially of importance metabolically, but so far there are no clear indications as to its function in the body." Since serotonin is present in the intestinal mucosa in higher concentration than in any other tissue in the body, since it causes isolated pieces of intestine to contract, and since when given by mouth to mice it increases the amount of faeces passed, it has been suggested that it may play a major role in determining the rhythm of the bowel in man. A. M. Connell, E. N. Rowlands and P. B. Wilcox<sup>2</sup> have tested this hypothesis by observing the effects of feeding large amounts of it in the form of bananas to a group of normal subjects and measuring the excretion in the urine of its metabolic product 5-hydroxyindolacetic acid. Several investigators, it may be noted parenthetically, have shown that bananas contain relatively large amounts of serotonin; according to J. A. Anderson, M. R. Ziegler and D. Doeden<sup>3</sup> the average banana contains 4 mg. of serotonin. From indirect evidence Connell, Rowlands and Wilcox estimated that their bananas contained between 1.9 and 3.5 mg. of serotonin per banana. Each of six normal subjects was given twelve bananas, most of which were eaten in the first hour. From the excretion in the urine of 5-hydroxyindolacetic acid it was estimated that from 75% to 100% of the ingested serotonin was excreted in the urine in 24 hours. None of the subjects complained of diarrhoea, urgency, colic or borborygmi. Twenty patients suffering from chronic diarrhoea were examined for urinary excretion of 5-hydroxyindolacetic acid, and the average excretion was 4.3 mg. per day as against 3.9 mg. in normal subjects; the spread in the two groups was about the same. It is evident then that serotonin does not play any important part in the control of intestinal movements or in the production of diarrhoea.

<sup>1</sup> *Lancet*, 1960, 1: 1345 (June 18).

<sup>2</sup> *Amer. J. Med.*, 1960, 28: 99 (January).

<sup>3</sup> *Med. J. Aust.*, 1959, 2: 688 (November 7).

<sup>4</sup> *Gut*, 1959, 1: 44.

<sup>5</sup> *Science*, 1959, 127: 236.



## Abstracts from Medical Literature.

### NEUROLOGY.

#### Pregnancy and Relapse in Disseminated Sclerosis.

J. H. D. MILLAR *et alii* (*Brain*, September, 1959), in a discussion of pregnancy as a factor influencing relapse in disseminated sclerosis, conclude that the data of Allison and Millar, which have been used, reveal no evidence of an ultimately worse prognosis in terms of frequency of relapse for child-bearing women than for others. There is evidence that relapses which would have occurred to women who experience pregnancy are sometimes "anticipated" by pregnancy although they would probably have occurred anyway at a later date. It is suggested that this "anticipation" might be brought about by the stresses of labour and increased work and responsibility of the puerperium. This suggestion needs investigation, preferably by prospective study, as it implies that any stress, "therapeutic" or otherwise, provoking a relapse in this anticipatory fashion, might be expected to be followed by longer remission than would otherwise have occurred. The authors conclude that women who suffer from disseminated sclerosis should receive care during childbirth to make it as easy a time as possible, and they should be relieved of as much strain and work as possible in the puerperium.

#### Isolated Trigeminal Neuropathy.

J. D. SPILLANE AND C. E. C. WELLS (*Brain*, September, 1959) discuss 16 cases of isolated trigeminal neuropathy. In 15, sensory function only was affected. Pain, numbness and paresthesia are the symptoms. On examination, the pain sense was more frequently found to be affected than any other modality, and analgesia was denser than thermoaesthesia. Taste may be involved and sometimes autonomic fibres. In one case there was trophic destruction of the nose. The condition has to be differentiated from conditions due to tumours, and to infiltration, inflammation and degeneration of the Gasserian ganglion. The value of basal radiographs of the skull in which enlargement of the exit foramina of the lower trigeminal divisions may be detected is stressed. Various possible aetiological factors are considered, including disseminated sclerosis, herpes and other virus infections.

#### Subarachnoid Haemorrhage.

W. McKISOCK AND K. W. E. PAINE (*Brain*, September, 1959) discuss 408 patients with spontaneous subarachnoid haemorrhage admitted to their neurosurgical unit between April 1, 1954, and June 30, 1956. In addition, information on an additional 373 patients admitted to the general hospitals in the area was obtained. The authors think the most common cause of intracerebral haemorrhage in younger people is rupture of an angioma which disintegrates. They found the causes of subarachnoid haemorrhage

in the total of 781 cases were as follows: (i) ruptured intracranial aneurysm, 45% of cases; (ii) ruptured intracranial angioma, 5% of cases; (iii) unexplained, 50% of cases. The commonest sites of ruptured aneurysm were as follows: (a) anterior communicating artery (31%), (b) posterior communicating artery (21%), (c) middle cerebral artery (18%), (d) multiple (15%). The maximum age incidence was between 40 and 70 years. In discussion of the results of treatment, the authors state that the majority of patients were treated conservatively with absolute bed rest for four to six weeks, then gradual mobilization. About one-quarter were operated on. The mortality rate of the whole group was 46%. This rate rose with increasing age and was higher in the hypertensive group. After survival from any subarachnoid haemorrhage the patient has about a one-in-four chance of dying from a later haemorrhage. Twenty-nine per centum of deaths occurred within 24 hours of the haemorrhage. In the authors' experience two-thirds of the angiograms taken showed aneurysms or angiomas. They state that the gross figures in their series give no indication as to whether operations performed on 204 of the patients have significantly lowered the mortality of the group as a whole. The benignity of haemorrhage from an angioma is stressed. The authors conclude that because of the difficulty of the clinical diagnosis of the causal lesion in this group of patients, no proof of the value of surgery can come from a study of a large number of patients whose only common factor is the presence of blood in the cerebro-spinal fluid.

#### Some Sensory Syndromes in Children.

T. E. OGDEN, F. ROBERT AND E. A. CARMICHAEL (*J. Neurol. Neurosurg. Psychiat.*, November, 1959) discuss indifference to pain and sensory neuropathy in children. They describe a case of congenital indifference to pain. There is no objective neurological abnormality except that the patient, although recognizing the nature of all types of stimuli at normal thresholds, fails to evince the usual clinical manifestations associated with accepted pain-producing stimulation. Tests have shown that the peripheral and central pathways necessary for the recognition of various forms of stimulation are intact, but there is absence of the appreciation of pain. The nature of the mechanism at fault remains unknown. These children are not mentally deficient and have normal deep tendon and cutaneous reflexes, and normally innervated skin on histological examination. A case of progressive sensory radicular neuropathy is described. This is a familial, progressive, peripheral sensory neuropathy usually involving the feet first and to a greater extent the hands, with the sensory level rarely extending above the elbows and knees. The loss of pain appreciation is much more marked than that of other modalities. In contrast, another case is described in which the neuropathy is not progressive and the involvement is much more extensive. This child is of fair intelligence and is unable to feel any form of stimulus applied to the distal parts of the extremities; he does not respond in the normal manner

to extremely painful stimuli applied anywhere, except over the left side of the abdomen, where the threshold appears to be normal. Cranial and thoracic nerves, as well as those in the limbs, are involved in the sensory neurone degeneration.

### PSYCHIATRY.

#### Non-Sexual Neurotic Symptoms as a Cause of Sexual Deviations.

I. STEVENSON AND J. WOLFE (*Amer. J. Psychiat.*, February, 1960) state that the treatment of sexual deviations is commonly said to be difficult and results uncertain. Three cases of sexual deviations are reported. In these patients the deviation was determined by anxiety that did not have a sexual origin, and recovery was effected by overcoming non-sexual neurotic symptoms. The recoveries were not related to recall of repressed memories or the working out of special sexual conflicts. The alteration in sexual behaviour did not lead to the occurrence of other symptoms. Follow-up inquiries three to six years later showed that the patients had maintained their improvement. It is considered that the concept of "repressed emotion" has hindered the understanding of the processes of recovery from psychoneurosis with and without psychotherapy.

#### Physicians as Psychiatric Patients.

M. M. PEARSON AND E. A. STRECKER (*Amer. J. Psychiat.*, April, 1960) discuss physicians as psychiatric patients. One of the authors has been accustomed to seeing as patients four to five physicians per year. He reports on a total number of 66. It is considered that the living of a hurried existence will tend to produce disturbances in everyday life regarding office hours, appointments, eating and sleeping, and family responsibilities. It is considered that emotionally ill doctors do not seek help for themselves early enough, neglecting emotional problems as they do their physical disabilities. The most common unhealthy character trait appears to be one of self-destruction, as evidenced by long hours, absence of outside interests or physical exercise, no time for vacations, which together produce an attitude of morbid self-sacrifice. Another unhealthy trend appears to be an illusion of indispensability with an excessive need for power and prestige, rugged individualism, and "playing God". About one-quarter presented themselves with the problem of addiction. Psychotherapy on an out-patient basis was employed most frequently. On the whole the results of treatment were very satisfactory. It was considered that the doctor's education, training and experience have produced a basis for mature personality development and a good background for psychotherapy. One cardinal principle in treatment was the purposeful omission of the fact of his special medical education.

#### Chlorpromazine Administration.

N. W. WINKELMAN (*Amer. J. Psychiat.*, April, 1960) states that optimum therapeutic results from the administration of

chlorpromazine can be achieved only by understanding the patient's personality and his conflicts and not merely by controlling the associated motor agitation. The usual two means of approach are recognized: (i) helping the patient to suppress and repress painful conflicts, and (ii) helping the patient to recall and relive the memories and emotional conflicts with an understanding of the part they are playing in his present condition. Either of these basic techniques can be utilized with the help of chlorpromazine. Seventy-five patients had received chlorpromazine constantly for six years. Of 20 who had the drug withdrawn for two weeks, 15 showed partial return of symptoms after an interval of five to 12 days. It was found that those who were treated with the drug alone had a quick return of symptoms when it was ceased, whereas those who received psychotherapy in addition did not have a return of symptoms, or only a partial return. It is considered that long-term chlorpromazine therapy is extremely valuable, particularly when combined with suitable psychotherapy.

### The Predominating Symptom.

L. BARTEMEIER (*Amer. J. Psychiat.*, March, 1960) discusses the predominating symptom in some borderline cases. The patients considered had received psychiatric treatment for several years without apparent improvement. They complained of persistent physical symptoms accompanied by anxiety. It is characteristic of this group of patients that they feel desperate, have a fear of losing control of themselves, and complain that they are hopelessly ill. The author considers them to be suffering from a schizophrenic type of illness which is modified by the predominant symptom of anxiety. This manifestation is considered to act as a protection against further development of their psychosis.

### Psychiatrogenic Illness.

A. H. CHAPMAN (*Amer. J. Psychiat.*, April, 1960) states that psychiatrogenic illness implies the illness has been complicated rather than ameliorated by psychiatric attention. Such difficulties may occur as a result of interview treatment, psychiatric hospital procedures or diagnostic techniques. The psychiatric illness is a much more fluid illness than many physical illnesses and often is an exacerbation of a personality problem. The symptoms may not have become incapacitating were it not for psychiatric intervention. Psychosis has been known to be precipitated by interview treatment. A mild obsessive compulsive person may be precipitated into anxiety or depression if deprived of his systems and rituals. A psychosomatic symptom may be a protection against a psychotic episode. Psychotherapy may affect adversely emotional and social relationships and particularly interpersonal relationships when one partner has lost his passivity. An unresolved transference neurosis may result in persistent emotional and personality problems. Electroshock treatment has been known to precipitate a psychotic disorder, e.g., a schizoid personality not actively schizophrenic. Some phobic, dependent or anxious people are likely to return for further hospitalization,

having once experienced the protection and emotionally gratifying atmosphere of the hospital. It is recommended that much more restraint and judgement should be exercised in the exposure of the public to psychiatric concepts. Because of the increasing availability of psychiatric services a large number of persons are experiencing the techniques described above. It is important to recognize that some patients should not be treated psychiatrically.

### PHYSICAL MEDICINE. AND REHABILITATION.

#### The Management of Post-Mastectomy Lymphoedema.

G. K. STILLWELL (*J. Amer. med. Ass.*, December 26, 1959) discusses the role of physical medicine in the management of late post-mastectomy lymphoedema. He states that this syndrome, which is to be distinguished from the types of acute lymphoedema occurring in the early post-operative period, is a significant complication in 10% to 15% of patients who undergo radical mastectomies of the Halsted type, and that it occurs to some degree in about 50% of such patients. The treatment programme described consists of a period of some days in a department of physical medicine and rehabilitation, followed by a period of home treatment which is usually prolonged. During the first period manual and mechanical massage are used, in addition to isometric exercises and spiral bandaging. During the second period the patient carries out certain instructions, involving especially exercise, bandaging and elevation of the arm. Objective data as well as the reactions of the patients show that this programme generally reduces the discomfort and disability caused by the lymphoedema. The author points out that since the treatment programme involves attending to the arm several times a day for several months, it is important that the patient should learn how to carry it on without aid. Several patients who had success with this programme had previous failure with the use of elevation, massage or bandaging alone, and the author stresses that the entire programme, including the regular use of the pumping action of the muscles on veins and lymphatics, is more effective than the individual components alone. The author advises that unless there is some good indication for the use of heat, such as pain or cellulitis, it should not be used.

#### Psychiatric Considerations of Hand Disability.

S. H. FISHER (*Arch. phys. Med.*, February, 1960) discusses some of the psychiatric problems relating to hand disability, notably the following: evolutionary significance of the hand; amputation; phantom limb and pain; problems of prostheses; depression; denial; paralysis and deformity. He states that while medicine has tended towards increasing specialization, it has also seen the need for integration. While surgery has developed specialties in orthopedics, plastic surgery and neurosurgery, the recognition of the peculiar

properties of the hand has led to the integration of these three specialties into the one of hand surgery. Physical medicine, formerly concerned with the use of physical modalities in therapy, has developed into the more integrated specialty of psychiatry, incorporating the complex philosophy and techniques of rehabilitation. Psychiatry, formerly on the periphery of medicine, has moved inward to take its rightful place with other medical specialties. It is essential to be concerned, not alone with the disability but with the person who has the disability as well.

#### A New Device to Help in Management of Long Leg Braces.

F. BECKER (*Arch. phys. Med.*, March, 1960) describes the "Boomerang", a device to facilitate locking and unlocking of long leg braces, which may make the difference between a patient's being or not being able to extend his long leg braces to the lock position without aid. The device is offered because of its chief merit of overcoming this mechanical difficulty, quite apart from the fact that it facilitates the use of weakened upper extremities and reduces over-all energy and man-hour costs. The "Boomerang" is very strong, and seldom requires repairs even after years of continuous use.

#### A New Type Ergograph.

D. K. MATHEWS *et alii* (*Arch. phys. Med.*, March, 1960) describe in detail a new type of ergograph designed to circumvent some of the disadvantages of ergographs at present in use. The ergograph was built by the Division of Industrial Research in cooperation with the Fitness Laboratory in the School of Physical Education, State College of Washington.

#### Lower Motor Unit Lesions.

R. L. BENNETT (*Arch. phys. Med.*, February, 1960) discusses the evaluation and treatment of lower motor unit lesions involving the shoulder, arm, forearm and hand. He states that the physician who accepts the responsibility of caring for such a patient must understand the reaction of the motor unit to disease and trauma, and must have the ability to determine the site and extent of the lesion so that he can precisely prescribe and himself carry out, or supervise, the treatment of his patients. Diagnosis must be based on an accurate history and specific objective findings. These findings are obtained through observation of bodily movement, specific muscle strength testing and electronic analysis of motor unit function. The programme of care is based on the apparent contradiction that while full recovery is expected, something less than full recovery is anticipated. With this basis in mind, the techniques and devices used to promote recovery must in no way limit the possibilities of functional devices and orthopedic surgery if full recovery does not take place. In general, the treatment programme is made up of four components: (i) proper support of weakened bodily segments; (ii) intelligent mobilization; (iii) specific muscle reeducation; (iv) specialized functional analysis and training, with or without specialized orthetic devices and modified environment consistent with the site and degree of residual weakness.

## The Wider View.

CHRISTIAN MEDICAL COLLEGE, VELLORE,  
SOUTH INDIA.

### Origins.

VELLORE, a town of some 140,000 people, is situated 90 miles west of Madras. In 1900 a young American woman, Dr. Ida Scudder, came to Vellore and started work as a medical missionary. She soon realized, however, that the amount she could do on her own to meet the enormous needs of the population was very small, so she decided herself to undertake the training of medical workers. In 1907 she began training nurses, and in 1918, in the face of considerable opposition, she started a Women's Medical College, training girls for the L.M.P. degree. In 1942, this Women's College was upgraded to give the full M.B., B.S. course, and in 1947 the College became a coeducational institution. Since then it has grown and developed, until today it has become one of the foremost medical schools in the country.

### Students.

Today 25 men and 25 women medical students are taken each year for training for the M.B., B.S. degrees. These are selected from a large number of applicants, often numbering nearly a thousand. The process of selection is a complicated one. First there is a written examination, and on the basis of this, together with confidential reports and consideration of their previous academic record, 50 men and 50 women are chosen to attend the College for further tests and interviews. These are spread over a two-day period, and include personal and group interviews, lecturettes on subjects of current topical interest, tests to try to assess initiative, originality, qualities of leadership, cooperation and so on. On the basis of the results of all these, the final selection is made by a selection committee, whose members bear in mind the needs of the supporting bodies and try to preserve an all-India representation among the student body. Although these tests are protracted and complicated, as a result of them it can be predicted fairly accurately how a student will fare academically; but the relationship between the tests and the final product in terms of a "good doctor" is not always so clear.

### Training Provided.

The College is affiliated with the University of Madras—one of four such affiliated medical colleges. The degrees taken by the students are therefore M.B., B.S. (Madras). The medical course as laid down by the University consists of one year's "pre-professional" course—chemistry, physics, and biology, eighteen months' anatomy, physiology and biochemistry, and three years' clinical work, during which time pathology, bacteriology, pharmacology, etc., are also studied. After the final examinations have been passed, a year must be spent in residence as a "student intern" in a recognized hospital before the student gets his degree.

In addition, the College is recognized for training in various post-graduates degrees and diplomas—doctor of medicine, doctor of medicine in pathology, master of surgery, master of surgery in thoracic surgery and neurosurgery, and diplomas of gynaecology and obstetrics, clinical pathology, anaesthesia and child health.

Two types of general nursing training are given—an ordinary three-year certificate course, and a four-year course leading to the degree of B.Sc. (Madras) in nursing. Midwifery training is a one-year course, and specialized training is also given in public-health nursing. A post-graduate tutor-sister course is also available.

### The Hospital Today.

The Hospital now has a total of 780 beds, including general and special medical and surgical, gynaecological and obstetric beds, a pediatric ward, and an ophthalmic unit of 80 beds. Recently a ten-bed metabolic research unit has been opened through the generosity of the Wellcome Foundation.

Within India the Hospital is widely known, and this chiefly for its work in several fields, of which neurosurgery and thoracic surgery are outstanding examples. The neurosurgery department is under an Indian head, who has received international recognition by being invited to address the 1959 jubilee celebrations of the Montreal Neurological Institute. The thoracic surgical department was founded and built up by an American from the Lahey Clinic, who has done outstanding work in helping to develop thoracic and cardiac surgery in India. This department is now

recognized by the Central Government as a post-graduate training centre for thoracic surgeons.

Leprosy is unfortunately still very common in India, and outstanding work has been done by the orthopedic surgeon in correcting the deformities so frequently produced by the disease. In the neural type of the disease, a severe claw deformity of the hand is often produced. By suitably devised tendon transplant operations, it is possible to restore to a large measure the function of these hands. After operation, patients undergo a course of rehabilitation and physiotherapy, learning to use their hands in useful employment such as carpentry and other handicrafts, and also learning to take necessary precautions to protect their anaesthetic limbs from the trauma which is responsible for the loss of digits (and worse) which is so often associated with this disease.

### Research.

Other research work in progress in the institution covers a wide field, including the following: socio-economic factors in peptic ulceration, and the best forms of treatment under local conditions; enzyme chemistry in some neurological disorders; the epidemiology of the viral encephalitis,

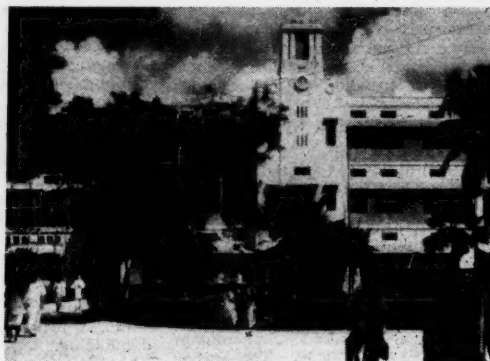


FIGURE 1.

Vellore Christian Medical College: Main Building.

especially Japanese B encephalitis; the pathogenesis aetiology, epidemiology and treatment of tropical pulmonary eosinophilia; a study of the incidence of atherosclerosis and the relationship with diet and serum lipoprotein patterns; the pathogenesis of tropical megaloblastic anaemias and certain hemolytic syndromes; a study of the mechanisms involved in intestinal absorption; the malabsorption or sprue syndrome; and a fairly large-scale rural survey, involving clinical, hematological, biochemical and nutritional studies.

### Medical Education.

In the realm of medical education, because the College is an independent institution, it is free within the limits imposed by the University curriculum to carry out experiments. The most significant of these is in the realm of the department of preventive and social medicine. Of India's 400 million people, 80% live in villages. It is therefore of the utmost importance that students should be able to learn the application of modern medicine and nursing to village conditions. During the last three years of the medical course, each student is allotted two family units in one of the villages adjoining the Medical College, and the students follow the progress of those families throughout the period, noting the various illnesses and the health record of the different members, helping when necessary, and offering advice on health promotion as opportunity arises.

A rural hospital has also been established and equipped on simple lines, in an attempt to reproduce the sort of hospital which it is hoped will ultimately be available to all villagers. Here students, nurses and student interns are taught to practise a high standard of scientific medicine, without all the ancillary aids which have become so much part of medicine in more wealthy communities.

In order to try to provide medical care for some of the villagers further away, and also as part of the training programme, twice a week a mobile dispensary visits a



circuit of outlying villages. This provides first-aid treatment for serious illnesses, and a good means of giving adequate treatment for more chronic diseases such as tuberculosis and leprosy. Patients with more serious acute illnesses can be transported to the hospital for treatment.

Some ten or fifteen times a year, also, the members of the ophthalmic department conduct eye camps in villages, when they may operate on up to 100 cataracts in one day, with surprisingly good results—even though the operations are carried on in the open, under relatively primitive conditions.

#### Staff.

The staff of the College and Hospital is international, the majority of its members being Indian, but there are some

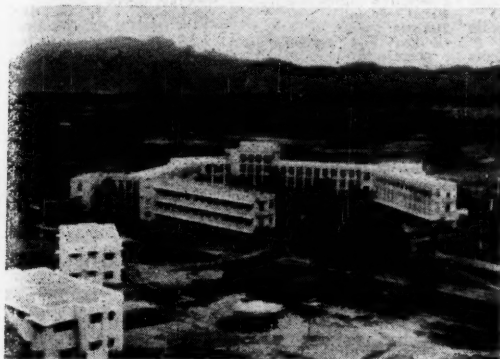


FIGURE II.

Men students' hostel outside the town.

also from America, Canada, England, Scotland, Ireland, Germany and Australia. The Australian contingent is six strong, including a pathologist, a public-health doctor, a biochemist, a physician and two physiotherapists.



FIGURE III.

Dr. Ida S. Scudder, founder of the College, who died on May 24, 1960, at the age of 90 years.

#### Support.

The institution is owned by an "Association", which is entirely Indian, and which is supported by some 56 different Christian organizations both in India and overseas. The total cost of running the institution—medical school and hospital—is in the region of £A300,000. This is only a fraction of the cost of running a similar-sized hospital in Australia. Quite a proportion of this difference is due to the lower cost of living in India, and hence lower wages. Of the total budget, about three-quarters is raised within India and one-quarter comes in gifts from overseas.

#### Medicine in Modern India.

India today faces an enormous problem in seeking to provide adequate medical care for her people. There is at

present an estimated figure of one doctor per 5000 head of population, but the majority of doctors live in the bigger towns, where there are only about 20% of the people. The situation with regard to nurses is even worse. There are today some 54 medical schools in the country; but it is estimated that this number needs to be doubled before the output of doctors can hope to meet the demands of the situation. Every year more medical schools are being opened; but there is always difficulty in finding suitable staff, for there is a great shortage of medical teachers.

The College at Vellore is helping in a small way to meet the need of the country for doctors, nurses and teachers of medicine. But Vellore is not just one among many. It has established a reputation throughout India for the high standards of patient care, teaching and research. The international representation on the staff is also an unusual feature in present-day Indian medical colleges, and this representation helps to contribute to the character of the institution. But, perhaps more than all, the institution has a specifically Christian foundation, and seeks in the words of its constitution "to train men and women in the spirit of Christ for service in the relief of suffering". At its very inception Dr. Scudder realized that health and wholeness of body were an essential part of the Christian Gospel, and today many of the students go out from the institution realizing this to greater or less extent. In this regard it is interesting to note that there is a considerably larger percentage of graduates from the College who go to work in rural areas as compared with graduates from other medical colleges in South India. Even today, in many parts of rural India, mission hospitals are the only available source of medical care, and there are now some 320 hospitals owned and run by the Church. Many of these look to Vellore to supply their future staff.

#### Help from Australia.

Australia can help to meet some of the needs of India in the following ways: by increasing opportunities for post-graduate training of prospective teachers; by sending specialists in various fields to visit Indian medical centres; by increasing aid in terms of money, equipment and personnel; and by encouraging exchange visits between members of Indian and Australian university departments.

It should be added that anyone going from Australia and spending a period of time in an Indian medical college could scarcely fail to be enriched in a number of ways, not least of which would be in the technical fields. The tremendous wealth of clinical material available in almost any branch of medicine and surgery has to be seen to be believed, and there are good opportunities for investigation and research. The traffic would certainly not be all one way.

Finally, there are still opportunities for medical missionaries, men and women who are prepared to carry on the work of the Great Physician, often in humble but none the less effective ways, in rural areas and other places where Government medical services have not yet penetrated.

—SELWYN BAKER,  
Vellore.

## Brush Up Your Medicine.

### NON-MERCURIAL DIURETICS.<sup>1</sup>

For convenient reference details of the principal non-mercurial diuretics in current use are set out in the following table. In each case trade names are also listed. Drugs which are available as Pharmaceutical Benefits are marked with an asterisk.

It should be noted that electrolyte disturbances are generally caused by excessive use, or careless use, of these drugs. Serum electrolyte levels should be determined periodically if maintenance therapy is given for a considerable period of time. Hypokalaemia may precipitate digitalis intoxication.

ALEX JOHNSON,  
Canberra.

<sup>1</sup>No. 7 of a series of synopses prepared by Dr. Alex Johnson of Canberra in collaboration with the Australian College of General Practitioners. Each synopsis has been submitted for approval to a leading member of the College, to a professor of pharmacology and to a specialist in the field concerned.



TABLE I. Non-Mercurial Diuretics.

Chemical Name and Trade Name(s).	Specific Action and Site.	Other Pharmacological Effects.	Indications.	Dosage.	
				Per Day.	Frequency.
Acetazolamide*. "Diamox."	Enzyme inhibitor. Acts specifically on carbonic anhydrase in renal tubule producing diuresis, with renal loss of $\text{HCO}_3$ , carrying out sodium, water and potassium. Tubular reabsorption depressed. Because fewer bicarbonate ions filtered through glomeruli, drug becomes progressively less effective.	Anticonvulsant action due to metabolic acidosis. Large doses decrease volume and acidity of gastric juice. Lowers intraocular pressure.	Mild congestive cardiac failure. Glaucoma. Toxemia and edema of pregnancy. Epilepsy.	1-2 tabs.	3-5 days each week.
Chlorothiazide*. "Chlortide."	Carbonic anhydrase inhibitor and potent chloruretic agent. Has also been termed a saluretic agent as sodium and chloride excreted in nearly equal amounts. Action takes place in renal tubules. Some excretion of bicarbonate, and potassium excretion also slightly increased. Chloruretic action is main one.	Potentiates ganglion-blocking antihypertensive drugs. No direct hypotensive action <i>per se</i> . Some claim that it reduces peripheral vascular resistance.	Congestive cardiac failure. Renal edema. Hepatic edema. Edema and toxemia of pregnancy. Pre-menstrual edema and tension. Edema from steroid therapy. Hypertension.	Moderate dosage 2-4 tabs.	Alternate days or 3 or 4 consecutive days each week.
Ethoxzolamide*. "Cardrase."	Inhibits enzyme carbonic anhydrase and prevents sodium and bicarbonate reabsorption in distal tubules. Selective action in diuretic doses occurs in distal tubules only. Urine becomes alkaline.	Renal excretion of chloride and phosphate not significantly altered. No direct hypotensive action <i>per se</i> . Lowers intraocular pressure by partially suppressing secretion of aqueous humour.	Congestive cardiac failure. Glaucoma (additive to miotics). Edema of pregnancy. Premenstrual edema. Edema from steroid therapy. Hypertension.	2-4 tabs.	3 consecutive days each week or alternate days.
Chlorazani*. "Daquin." "Orpidan."	Not a carbonic anhydrase inhibitor. Has both diuretic and natriuretic properties. Restricts reabsorption of water and salt in tubules. Elimination of each is independent of the other. Glomerular filtration not affected.	No direct hypotensive action <i>per se</i> .	Congestive cardiac failure. Pregnancy edema. Renal disease. Premenstrual tension. Hepatic cirrhosis. Steroid therapy. Hypertension.	3-5 tabs.	Daily, with occasional 5-day breaks.
Hydrochlorothiazide*. "Eldrex." "Dichlotride." "Direma."	Diuretic, chloruretic and natriuretic. A salt-diuretic which inhibits the tubular reabsorption of sodium and chloride and to a lesser extent of potassium. Potent chloride-excreting effect. Virtually no effect on bicarbonate excretion. A weak carbonic anhydrase inhibitor.	Remains fully active whether patient acidotic or alkalotic. No direct hypotensive action <i>per se</i> . Does not tend to produce acidosis and does not interfere with renal blood flow.	Cardiac edema. Edema in renal disease: chronic glomerulonephritis and nephrotic syndrome. Toxemia of pregnancy. Edema from steroid therapy. Hypertension.	1-3 tabs. Single daily dose satisfactory.	3 consecutive days each week or alternate days.
Hydroflumethiazide. "NaClex." "Hydrenox."	Weak carbonic anhydrase inhibitor. Potent diuretic with predominant effect on chloride excretion (natriuresis). Chloruresis similar to chlorothiazide. Increases urinary excretion of sodium and chloride ions and, to a lesser degree, potassium ions (saluresis). Action due to decreased tubular absorption of these ions.	Little effect on excretion of bicarbonate. Claims have been made that it has antihypertensive properties. Produces diuresis in normal subjects.	Edema in congestive cardiac failure, pregnancy, pre-menstrual tension, nephrosis, chronic glomerulonephritis, steroid therapy. Hypertension.	2-4 tabs.	Preferably alternate days and not more than 5 days each week. One tablet twice weekly often adequate for maintenance therapy.
Amisometradine. "Rolleton."	Enzyme inhibitor, but neither succinic dehydrogenase nor carbonic anhydrase involved. Prevents reabsorption of sodium in renal tubules by interference with sulphhydryl enzyme system. Sodium and chloride excreted in equimolar quantities, excreted sodium carrying proportionate quantities of water with it.	Does not disturb acid-base balance. No undesirable cardiovascular effects have been noted.	Congestive cardiac disease. Pre-menstrual tension. Toxemia of pregnancy. Particularly useful in edematous states associated with sodium retention. Steroid therapy.	800 mg.	Daily.

## Out of the Past.

### ON AUSTRALASIAN CLIMATES.

[From "On Australasian Climates and Their Influence in the Prevention and Arrest of Pulmonary Consumption", by S. Dougan Bird, London, 1863.]

It will be well here to say a few words about the hot wind, which is usually the "bête noire" of new arrivals in the colony. Such winds occur, on an average, eight or nine times during the year, under the circumstances which I have just detailed. Their duration, until the wind

changes to south-west and south, as it always does, varies. The longest period on record is forty-eight hours; but this is very exceptional. They do not generally last more than six or seven. The actual cause of their high temperature is doubtful, now that the non-existence of the 'great central desert' is proved; but there can be no doubt that the extensive bush-fires, which are common in summer, have their influence. During the last few years, since so much of the up-country to the north and east has been cleared and settled, the hot winds have notably decreased in frequency and duration. In some parts of Victoria, particularly in the western district, they are rarely experienced; and when they do occur, it is in a very modified form. But the high temperature of the air during the prevalence of these winds, from the dryness with which it is always associated, causes a greatly

TABLE I. Non-Mercurial Diuretics.

Side Effects.	Electrolyte Disturbances.	Other Therapeutic Indications.	Remarks.	Strength and Manufacturer's Pack.	Cost to Patient.
Low toxicity. Drowsiness, malaise, headaches, paraesthesiae. Easily reversible.	Acidosis. Hypokalaemia. Metabolic acidosis tends to develop as result of renal loss of sodium bicarbonate and water, since bicarbonate concentration of extracellular fluid falls while chloride concentration rises.	Useful in combination with mercurial diuretic as one corrects distortion of acid-base balance produced by other.	Efficacy as diuretic diminishes with continued use. Diuresis inferior to that produced by mersalyl. Intermittent use as a diuretic preferable. Ammonium chloride blocks action of "Diamox".	250 mg. tabs. Bottles of 25, 100 and 1000.	25 .. 43/-
Uncommon. Anorexia, nausea, vomiting, diarrhoea, rash, postural hypotension. Signs of electrolyte depletion and fluid imbalance. Side effects easily reversible.	Uncommon. Hypochloremia alkalosis. Hypokalaemia, especially in debilitated patients.	Hypertension, as potentiating agent with ganglion-blocking drugs.	Potassium chloride supplements may be necessary. Renal tolerance can occur after repeated administration. Has, in many respects, a diuretic action similar to mersalyl.	500 mg. tabs. Bottles of 25, 100 and 500.	25 .. 40/- 100 .. 130/-
Low toxicity. Nausea, dizziness, drowsiness, anorexia, paraesthesiae. Signs of electrolyte depletion and fluid imbalance. Side effects easily reversible.	Hypochloremic alkalosis. Hypokalaemia.	Epilepsy, as adjuvant therapy. Hypertension (adjunctive management). Potentiates mercurial diuretics.	Tolerance develops after 4 days' administration and diuretic effect lessens. Hence to get sustained diuretic effect give on three consecutive days each week or on alternate days. Contraindications: Renal failure, Addison's disease, hyperchloremic acidosis and any conditions in which sodium and/or potassium levels depressed.	125 mg. tabs. Bottles of 25 and 100.	25 .. 40/- 100 .. 130/-
Low toxicity. Occasionally thirst.	Risk of hypokalaemia small.	Hypertension (adjunctive management).	Contraindications: dehydration, sodium deficiency states, uraemia and azotemia. Tolerance does not develop. Half as potent as chlorothiazide.	25 mg. tabs. Bottles of 25 and 100.	25 .. 10/- 100 .. 29/-
Low toxicity. Nausea, skin eruption and photosensitivity occasionally. Watch for signs of electrolyte depletion and fluid imbalance. Side effect easily reversible.	Hypochloremic alkalosis. Hypokalaemia more likely to develop in patients with chronic oedema and sodium retention. To assist in prevention give citrus fruit juice or potassium chloride daily. Plasma chloride concentration may fall.	Hypertension (adjunctive management). Potentiates ganglion-blocking antihypertensive drugs.	Tolerance does not readily develop. Ten times as potent as chlorothiazide. Remains fully effective whether patient acidotic or alkalotic.	25 mg. tabs. Bottles of 25 and 100.	25 .. 40/- 100 .. 131/6
Low toxicity. Side effects rare and usually caused by electrolyte imbalance. Occasionally psychic disturbance in patients with cirrhosis.	Acid-base balance fairly stable even after prolonged therapy. Hypokalaemia not as marked as with chlorothiazide. No significant changes in serum electrolytes.	Potentiates ganglion-blocking antihypertensive drugs.	Ten times as potent as chlorothiazide. Repetitively effective and tolerance does not seem to develop readily. Supplementary potassium necessary in patients on prolonged therapy. Has a more prolonged action than chlorothiazide. Increases sensitivity to digitalis.	50 mg. tabs. Bottles of 100 and 500.	50 .. 44/6 100 .. 86/6
Rare. Mild gastric irritation with nausea, vomiting or diarrhoea occasionally.	Hypochloremia.	Useful to stimulate initial diuresis in all patients except those with severe congestive failure, if parenteral mercurials contraindicated. Effective adjuvant when it is desired to curtail therapy with mercurial diuretics.	Seems to be repetitively effective. May be given in presence of cardiac, renal or hepatic disease.	400 mg. tabs. Bottles of 20, 100 and 500.	20 .. 30/- 100 .. 129/-

increased evaporation from the lungs and skin; and consequently, a far less degree of inconvenience to the animal body than when the same temperature is associated with moisture, as in the sirocco of Southern Europe. In Sicily, or Malta, when this wind is blowing, both natives and foreigners are rendered utterly incapable of exertion. In India, no one dreams of stirring beyond the influence of his punkah and tattles in the mid-day in summer; but in neither case is the thermometer so high as it is in a hot wind in Melbourne, which never interferes with business, and hardly with pleasure. In a stone house, with a southern aspect, it is not a difficult matter to keep the air 15° or 20° lower in temperature than that without, by closing the doors and windows carefully, for a few hours, till the wind changes. A thermometer in the shade, but exposed to the wind, will rise to 105° or

110°; while, out of its immediate influence, the mercury will sink to 85° or 90°. To a new comer the little inconvenience he experiences from these high temperatures is marvellous, though the cool southerly sea breeze in the afternoon is delightful to everyone . . . .

The amount of ozone in the air, as tested by Schönbein's papers, is very considerable in all the Australasian colonies, and follows with great exactitude certain rules with regard to the direction of the wind. Thus, in Melbourne, the ozonic reaction is least in east winds, increases with north and north-west winds, and reaches its maximum when the wind blows from south-west, whilst towards the east it gradually decreases. Thus the most prevalent and powerful winds during the whole year are those which are the most highly ozoniferous.

## Correspondence.

### MEDICAL RESEARCH IN AUSTRALIA.

SIR: Your leading article of June 25, 1960, on this subject, and the correspondence it has aroused, prompt these comments:

1. Although contrary views are often expressed, there is really a large amount of medical research going on in various parts of Australia. Certainly, as Coppleson has said, the establishment of the National Health and Medical Research Council in 1937 has been a potent stimulating factor. The fact that you had little difficulty in collecting data listing current researches to fill over six pages in small type in the Journal is a good index; the record of the amount and range of the work proceeding must have surprised many of your readers.

2. The work done in earlier years, before the present flood, was by no means negligible. Outstanding in this State, for instance, were the studies on hydatid disease by Stirling, Verco, Thomas and Lendon. Later, just after World War I, Brailsford Robertson did valuable work on growth and senescence. Incidentally, Robertson was the first in Australia to manufacture insulin, thus enabling physicians in this State early to apply the Toronto work. Robertson's building-up of the Nutrition Section of C.S.I.R.O.—he was the section's first Director—is a lasting memorial to his ability and enthusiasm.

3. The support of medical research through the establishment of the National Health and Medical Research Council by the Federal Government was a master stroke. The happy association of research and the application of its results, effected by the constitution of the Council, has proved valuable. At first the Council had available to it only £30,000 per annum for its research grants; in recent years the annual amount has reached over £200,000. Obtaining new knowledge in these days is a costly business, as Coppleson mentions. By contrast, many early discoveries in medical science did not cost a great deal. It is inevitable that the expenses should rise, for many of what might be called the simple problems have been cleared. The intricate ones that remain often require for their solution highly trained scientists and technicians, elaborate apparatus, and special buildings and fittings. It is proper that the cost of all that should be borne by the Nation.

4. Research can rarely be done just to order. Everybody recognizes that the results from *ad hoc* researches are likely to be limited in value. A collection of essays by Brailsford Robertson was published shortly after his death under the title "The Spirit of Research". Those essays set out the ideals of research, and they are worth the study of every young research worker. The University of Adelaide owes much to Robertson; his influence on all who were fortunate enough to be associated with him in his work was inspiring indeed. It is the man that counts in research work: the project evolves under his direction.

5. Long years of association with the work of the National Health and Medical Research Council have convinced me of the high value of having representatives of various medical groups associated with the researchers on the Council and its committees. My view is that a special Medical Research Council for Australia is not required at present and that its establishment would be a disadvantage. The Medical Research Advisory Committee of the N.H.M.R.C. is well qualified to carry out the essential work of administration involved in the conduct of medical research. The N.H.M.R.C. and its committees, at present constituted, can deliberate not only on the intricacies of the researches (including the proposals, methods and results), but also on the community needs—how to put to best use what the researchers discover. Dr. R. E. Richards, who has been the medical recorder of the Council since its inception, has maintained close acquaintance with medical research generally in the various Australian centres. His knowledge of what is going on in the universities, hospitals and research institutions throughout Australia must be exceptional—he could himself carry out the functions of a coordinating committee.

6. It is clear that the direction of medical research in Australia at the present time must rest largely with the professors and lecturers in our medical schools. Those men should be given ample free time to devote themselves to research; their whole working time should not be taken up with teaching duties. Although the main job of the medical schools is to teach young men to be good doctors—healers

of the sick and advisors on healthful living—it is desirable that every graduate should be infused with the spirit of research. From there the College of General Practitioners can carry on the work—and in many researches the cooperation of men in practice can be significant.

7. From the standpoint of the general community it is the application of the results of medical research that matters. To get new knowledge is one thing, to apply it another. Several years ago Robert Hutchison said (perhaps with tongue in cheek) that there should be a world-wide five years' moratorium on medical research; during that time practitioners should endeavour to apply all the knowledge then available.

8. One of the greatest difficulties, so it has appeared to me, is the selection of grantees, and especially of the men new to the field, the young graduates. It is practically impossible to judge the ability of a research worker until he has had good opportunities to do some research. It is recognized that the outstanding man will make his own opportunities, as the great James Mackenzie did—but Mackenzies are rare. Young men presenting promising ideas generally get the support of the Council for a trial run, so to speak. Further support comes according to performance. It used to be said that Australia drove its good researchers to seek opportunities abroad through lack of them here, but that is not true today.

9. Coppleson mentions the importance and difficulties of coordination. It might be said that ideally coordination should be carried out on a world basis, and indeed for many problems that has been done by WHO. Anyway, I do not think it matters much if coordination is imperfect. A colleague in Britain a few years ago published an article in *The Lancet* lauding the value of overlapping. Every good researcher takes pains to keep himself acquainted with what is going on in his subject in other parts of the world. It is often desirable that research projects along similar lines should be conducted simultaneously in various places—in that way a kind of control is effected. In these days of voluminous publication and speedy communications there is little difficulty in keeping contact, if there is time to do the reading.

10. I understand that the research funds available to the medical schools are rather limited, apart from the annual grants made them by N.H.M.R.C. It is good that the Council makes those grants, for research work going on in a medical school is a stimulating catalyst throughout the undergraduate classes. Dr. Coppleson's letter is evidence of the good work being done by Post-Graduate Committees in Medicine. Those bodies are continuing to promote the diffusion of new knowledge.

In short, Australia can take pride in its achievements in medical research, the increased support of Governments is highly encouraging, the existing organizations can meet the present needs, and suitable means are available to spread knowledge of discoveries and to apply them in practice. Steady expansion of the existing provisions, and especially the encouragement of clinical research, are especially desirable.

Yours, etc.,

170 North Terrace,  
Adelaide,  
July 22, 1960.

A. R. SOUTHWOOD.

### GENERAL PHARMACEUTICAL BENEFITS.

SIR: W. T. Gibbs' suggestion (Med. J. Aust., July 30, 1960, page 197) that the Medical Benefits Fund extend its scheme to subsidize drugs seems commendable. More than this, it recognizes what so many naively forget—that he who pays the piper calls the tune; i.e., reasonable regard must be had to costs borne by the subsidizing body (without detriment to the patient, of course).

Hayhoe (1960) wrote<sup>1</sup>: "If ferrous sulphate were always preferentially prescribed . . . there would be a saving of £40,000 per annum in Scotland alone . . ."

Whoever plotted and planned and "sprung" the Pharmaceutical Benefits Scheme may well hold the profession in contempt. Perhaps the Australian College of General Practitioners and The Royal Australasian College of Physicians could establish whether, in general, we are prescribing reasonably. Until the facts are known, the Treasury and Cabinet can only know one side of the coin—and, unfortunately, they are quite unaware of the nature of the problems of medical practice.

<sup>1</sup> Brit. med. J., 1960, 1: 1195.



**Re nationalization:** We should take heed, not umbrage, that a Government has been illogical and crafty in its success by legal stealth, so far. As a venerable seer said on Wednesday night, the profession must evolve a plan to ensure that medical help is available to all who need it without financial hardship—and obviously advertise it, and seek Government approval for it.

**Housing, poverty, ignorance and mental illness, etc.,** play such a large part that the matter is complex. Re-shuffling the profession's earnings-by-personal-exertion, and wasting a rake-off to help pay a new battalion of clerical police, is no answer—but we must indicate the alternative.

Yours, etc.,

Sydney.  
July 30, 1960.

BACHELOR OF MEDICINE.

Sir: May I briefly support Dr. H. T. Illingworth's letter (*MEDICAL JOURNAL OF AUSTRALIA*, July 23, 1960)? I have myself been active in criticizing the present Pharmaceutical Benefits Scheme, and while continuing to urge that we dissociate ourselves from it, I strongly endorse the suggestion that "unless we have our own plan, we will have a form of socialized medicine thrust upon us as they have in Great Britain and New Zealand".

By evolving a plan of contributory national insurance in advance of public opinion we will have some chance of retaining the good features of present medical practice in Australia, while remedying the hardship which serious illness undoubtedly places on some sections of the community. May I suggest that every doctor write to the British Medical Association suggesting that a committee be appointed to examine the whole situation, with a view to formulating a plan which may prove satisfactory to the profession as well as to the Government and the public?

Yours, etc.,

C. BRIDGES WEBB.

20 Kaye Street,  
Traralgon,  
Victoria.  
Undated.

Sir: Why did it require an Extraordinary General Meeting called by the Illawarra Medical Association before the B.M.A. storm troopers were called out to elect an anti-nationalization committee?

Why was action not taken earlier?

Yours, etc.,

JOHN A. McCLUSKIE.

133 Wigram Road,  
Glebe, N.S.W.,  
Undated.

#### BRUSH UP YOUR MEDICINE: OTITIS MEDIA AND OTITIS EXTERNA.

Sir: In a synoptic type of presentation such as the one used in the articles on otitis media and otitis externa in your recent "Brush Up Your Medicine" series, one looks for a succinct, factual and up-to-date guide. This can truly be said about most of the statements, but I would like to take your author up on a few of his remarks.

First, in acute otitis media he puts *Staphylococcus aureus* at the head of his list of causative organisms. In my view, acute otitis media is well treated by general practitioners and rightly so; complicated or antibiotic-resistant cases are not frequently seen by otologists. This pattern suggests an organism that is sensitive to most antibiotics. How can it be reconciled with the known incidence of the antibiotic-resistant *Staphylococcus* in general practice?

Secondly, there is the role of *Staph. aureus* in otitis externa circumscripta. The fact that it is a "furuncle or infected sebaceous cyst" in the skin of the external auditory meatus should not alter the dermatological or antibiotic principles involved. Your author mentions the following points about antibiotics in the regimen of treatment, which he says could be a typical one: "(b) Insert a wick saturated with Polymyxin B sulphate . . . (c) Prescribe chloram-

phenicol drops for patient to use over the wick. (d) Remove wick . . . two days later. (e) Continue chloramphenicol drops . . . for one week . . . (f) Apply boric acid ointment (10%) after infection subsides; or bacitracin and neomycin sulphate ointment can be considered." He then goes on to say: "Systemic administration of broad-spectrum antibiotics is necessary, usually on account of severity of pain and the urgency of instituting an intensive régime of treatment. . . . Chloramphenicol or one of the tetracyclines (given orally), depending on clinical judgement and experience, is the antibiotic of choice." Quite apart from the cost (? to the patient, ? to the Commonwealth Government), does not this suggest uncertainty about the antibiotic-sensitivity of the organism? My interpretation of modern trends in treatment of acute localized infections of the skin in any part of the body is that there is a swing away from systemic antibiotic therapy. Strangely enough, speaking later in the article about probable causes of granulations from denuded areas of skin, your author mentions "(a) Over-use of antibiotics".

When next he comes to otitis externa diffusa, your author says "culture and sensitivity tests are required". My contention therefore is that if one is going to be discriminating about some organisms, why not be the same about an organism like *Staph. aureus*, notorious for its antibiotic-resistance?

Finally in chronic suppurative otitis media the statement that "a few arise insidiously and are tuberculous in nature" demands some justification. Surely tuberculosis in this situation must be excessively rare in general practice. It would be interesting to hear bacteriologists' views about this and other points in the articles.

Yours, etc.,

VOLNEY BULTEAU.

R.P.A.H. Medical Centre,  
100 Carillon Avenue,  
Newtown, N.S.W.  
July 20, 1960.

#### WANTED: A MEDICAL SUPERINTENDENT FOR FIJI.

Sir: May I bring to the attention of your readers the urgent need for a medical superintendent at the Methodist Hospital in Fiji.

Situated at Ba, it is approximately a sixty-bed hospital, in the main for women and children. It is a training centre for Indian nurses. There are four triple-certificated sisters at the hospital as well as an Australian secretary-accountant.

The Methodist Hospital at Ba is the only non-Government hospital in Fiji and is regarded as a strategic centre of Christian healing in an Indian population of 50,000 people.

Any doctor interested in this important work may obtain further particulars from the Reverend C. F. Gribble, 139 Castlereagh Street, Sydney.

Yours, etc.,

H. G. JUDKINS.

Whitehorse Road,  
Box Hill,  
Victoria.  
July 26, 1960.

#### THE LANGTON CLINIC—OUT-PATIENT SERVICES FOR ALCOHOLICS.

Sir: The out-patient department of the Langton Clinic has been extended to provide services, psychiatric and medical, for alcoholics. Clinics will be conducted Mondays to Fridays between the hours of 11 a.m. and 7 p.m., and practitioners are invited to refer alcoholic patients between these hours.

I would be grateful if notice of this extended service could be given to medical practitioners through the Journal.

Yours, etc.,

A. P. DIEHM,  
Secretary and  
Chief Executive Officer.

The Langton Clinic,  
Cr. Dowling and Nobbs Streets,  
Moore Park,  
Sydney.  
August 1, 1960.

## Post-Graduate Work.

### THE MELBOURNE MEDICAL POST-GRADUATE COMMITTEE.

#### PROGRAMME FOR SEPTEMBER, 1960.

THE Melbourne Medical Post-Graduate Committee announces the following programme for September, 1960.

#### Metropolitan Refresher Courses.

##### *Pædiatrics.*

A pædiatric refresher course will be held at the Royal Children's Hospital from August 29 to September 2.

##### *General Medicine and Surgery.*

A course in general medicine and surgery will be held at St. Vincent's Hospital, from September 5 to 10.

##### *Gynæcology and Obstetrics.*

A gynæcology and obstetrics refresher course will be held at the Royal Women's Hospital, as follows:

Monday, September 12: Registration and tour of hospital, Dr. J. Laver and Professor L. Townsend; "Labour Ward Emergencies", Dr. F. Forster; obstetrical round, Professorial Unit; "Analgesia in Labour", Dr. K. McCaul.

Tuesday, September 13: "Minor Difficulties in the Ante-Natal Period", Dr. P. Jeffrey; gynæcological round, Dr. J. W. Johnstone; obstetrical and gynæcological quiz, Dr. C. K. Churches and Dr. M. Mackie; "Sterility", Dr. G. Ley.

Wednesday, September 14: "Assessment of Disproportion", Dr. R. M. Rome; gynæcological round, Dr. C. K. Churches; obstetrical and gynæcological quiz, Dr. C. N. de Garis and Dr. D. F. Lawson; "Diabetes and Pregnancy", Dr. R. M. Rome.

Thursday, September 15: "The Prevention of Preeclampsia and Management of Hypertension", Professorial Unit; ante-natal clinic, Professorial Unit; "Preeclampsia", Professor H. Taylor; "Cancer of the Uterus", Dr. A. M. Hill.

Friday, September 16: "Abortion and Habitual Abortion", Dr. W. J. Rawlings; gynæcological round, Dr. A. M. Hill; gynæcological patients, Professorial Unit; "Nursery Infections", Dr. J. Laver.

Monday, September 19: "Dangers at the Third Stage", Dr. M. Mackie; "Maternal Mortality", Professorial Unit; discussion on hormones, Dr. J. W. Johnstone and Dr. W. J. Rawlings; "Anesthesia in Obstetrics and Gynæcology", Dr. K. McCaul.

Tuesday, September 20: "Difficulties Encountered in Cesarean Section", Dr. C. N. de Garis; operative demonstration, abdominal hysterectomy, Dr. A. R. Long; gynæcological out-patients, Dr. H. B. Hattam; "Macroscopic Diagnosis in Gynæcological Pathology", Dr. H. F. Bettinger.

Wednesday, September 21: "Difficulties Associated with Induction of Labour", Dr. J. Smibert; ante-natal clinic, Dr. R. M. Rome; "Anæmia and Pregnancy", Dr. M. Whiteside; gynæcological patients, Dr. D. F. Lawson.

Thursday, September 22: "Prolonged Labour", Professorial Unit; operative demonstration, vaginal repair, Dr. B. Anderson; "Abortion", Professor H. Taylor; gynæcological out-patients, Dr. V. Hollyock.

Friday, September 23: "Ante-Partum Hemorrhage", Dr. G. D. Ley; "Neo-Natal Infections", Dr. Kate Campbell; "Hyaline Membrane", Dr. T. G. Maddison; "Postscript", the Dean.

The fee for the course is £14 14s., and enrolments should be sent to the Committee by August 29. It will be desirable for those taking part to wear long white coats. Residence at the Hospital is available and should be reserved through the Committee. The fee for board and residence is £7 10s. per week, payable to the Hospital.

#### Royal College of Obstetricians and Gynæcologists: All-Day Clinical Meeting.

Attention is directed to the clinical meeting which the Victorian State Committee of the Royal College of Obstetricians and Gynæcologists will conduct at 8 Latrobe Street, Melbourne, on September 25. Inquiries should be addressed to the Secretary at that address.

#### Television Demonstrations.

A series of operative and general demonstrations will be televised on a closed circuit to the Melba Hall and Public

Lecture Theatre, as follows: on the evenings of August 25, 26 and 27 to the Melba Hall, and on the afternoon of August 31 and the evenings of September 1 and 2 to the Public Lecture Theatre, University. All members of the medical profession will be invited and will receive details.

### THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

#### Annual Subscription Course.

THE Post-Graduate Committee in Medicine in the University of Sydney announces the following programme of overseas lecturers during August and September, 1960.

Mr. Norman Tanner, Consulting Surgeon, Charing Cross Hospital and Director of the Gastro-Enterological Clinic, St. James Hospital, London, will give the following lectures:

Tuesday, August 23, 8.15 p.m., I.C.I. Theatre (Circular Quay entrance), "Surgery of Peptic Ulcer".

Monday, September 5 (evening), Royal Newcastle Hospital, Newcastle, "Surgery of Peptic Ulcer".

Tuesday, September 6, 3.30 p.m., A.M.R. Lecture Theatre, Royal Prince Alfred Hospital, "The Case for Vagotomy in Gastric Surgery"; 8.15 p.m., I.C.I. Theatre (Circular Quay entrance), "Cancer of the Stomach".

Wednesday, September 7, 2 p.m., Maitland Lecture Hall, Sydney Hospital, "Surgery of Portal Hypertension".

Thursday, September 8, 10.30 a.m., St. Vincent's Hospital, Darlinghurst, "Gastro-Enterostomy and Stomach Ulceration".

Friday, September 9, 1.15 p.m., Scot Skirving Lecture Theatre, Royal Prince Alfred Hospital, "Post-Gastrectomy Syndrome".

Dr. E. L. Wynder, of the Sloan-Kettering Institute for Cancer Research (the Research Unit of the Memorial Centre for Cancer and Allied Diseases), will be in Sydney from August 18 to 22 on his way to the Victorian Cancer Congress. Tentative arrangements have been made for Dr. Wynder to give an evening lecture on "Cancer Epidemiology" on Thursday, August 18. Confirmation and location of this lecture will be advised in the Public Notices section of the *Sydney Morning Herald* on Wednesday, August 17.

#### Course in Obstetrics and Gynæcology at The Women's Hospital, Crown Street, Sydney.

The Post-Graduate Committee in Medicine in the University of Sydney announces that a course in obstetrics and gynæcology will be held at the Women's Hospital, Crown Street, Sydney, from Monday to Friday, August 29 to September 2, 1960, under the supervision of Dr. J. Newlands. Enrolments will be limited to 14 post-graduate students in residence and 12 attending as external students. The fees for attendance are £8 18s. 6d. (including board and residence) or £6 6s. (external attendance). Candidates may take up residence on Saturday afternoon, August 27, after 4 p.m. The programme is as follows:

Monday, August 29: 8.30 a.m., demonstration of surgical operation; 10 a.m., "Progestogens", Dr. Alan Grant; 11.15 a.m., "Endometriosis", Dr. R. Mackey; 2 p.m., "Rotation of Fetal Head" (demonstration), Dr. R. Macbeth; 3.15 p.m., "Abnormal Labour", Dr. W. McBride.

Tuesday, August 30: 8.30 a.m., demonstration of surgical operation; 10 a.m., "The Placenta", Dr. D. McGrath; 11.15 a.m., ward rounds, Dr. R. B. C. Stevenson; 2 p.m., sterility clinic.

Wednesday, August 31: 8.30 a.m., demonstration of surgical operation; 10 a.m., "Ectopic Pregnancy", Dr. F. Bellingham; 11.15 a.m., Cancer Clinic—Dr. R. B. C. Stevenson, Dr. S. Devenish Meares and Dr. W. McBride; 2 p.m., "Haemorrhage during Pregnancy", Dr. R. Bowman; 3.15 p.m., paediatrics, Dr. S. E. L. Stening, Dr. C. W. G. Lee and Dr. R. H. Vines.

Thursday, September 1: 8.30 a.m., demonstration of surgical operation; 10 a.m., medical clinic, Dr. F. Hales Wilson, Dr. Helen Taylor and Dr. T. I. Robertson; 11.15 a.m., "Fetal Heart Sounds", Dr. M. Drummond; 2 p.m., "The Causes of Maternal Collapse in Labour", Dr. S. Devenish Meares; 3.15 p.m., "Wider Horizons in Vaginal Cytology", Dr. J. Murray Moyes.

Friday, September 2: 8.30 a.m., demonstration of surgical operation; 10 a.m., "High Head", Dr. F. Bellingham; 11.15 a.m., "Toxæmia", Dr. R. B. C. Stevenson; 2 p.m., "Dysfunctional Uterine Bleeding", Dr. K. McGarrity.

All Cesarean sections will be demonstrated as they occur.

Written application, enclosing remittance for attendance as a resident or external student, should be made at an

early date to the Course Secretary, the Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Enrolments will be made in order of receipt of fees, and the list will be closed as soon as the required number of applications is received. Telephones: BU 4497-8. Telegraphic address: "Postgrad Sydney".

#### THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY.

##### Visit of Professor Howard Taylor.

THE following is the programme arranged for Professor Howard Taylor whilst he is the guest professor at the Women's Hospital, Crown Street, Sydney: Monday, August 22, 11 a.m., lecture, "Pre-Eclampsia". Tuesday, August 23, 9 a.m., operation—abdominal hysterectomy; 11.30 a.m., visit to Pathology Department. Wednesday, August 24, 9 a.m., lecture, "Ante-Partum Hemorrhage"; 11 a.m., visit to Cancer Clinic. Thursday, August 25, 9 a.m., discussion with physicians on medical clinic cases; 11 a.m., visit to Sterility Clinic. Friday, August 26, 9 a.m., operation, vaginal hysterectomy, or discussion of selected gynaecological cases; 11 a.m., discussion on selected obstetrical cases.

All medical practitioners are invited to attend.

#### SURGICAL SEMINARS AT ROYAL PRINCE ALFRED HOSPITAL.

SURGICAL SEMINARS are held by the Department of Surgery, University of Sydney, each Tuesday in the Clinical Room, Alfred and Mary Roberts Ward, Royal Prince Alfred Hospital, Sydney. Professorial unit rounds commence at 2.30 p.m., and post-graduates are welcome to attend. The programme of the surgical seminars from August 23 to October 4, 1960, is as follows:

August 23, 4.45 p.m., "Primary and Secondary Repair in the Surgery of Malignant Lesions of the Face"; speaker, Mr. E. W. Gibson; chairman, Mr. D. Officer Brown.

August 30, 4.45 p.m., "When to Reopen the Abdomen"; speaker, Professor Andrew Loudon; chairman, Mr. S. H. Lovell.

September 6, 2.15 p.m., case demonstration; 3.30 p.m., "The Case for Vagotomy in Gastric Surgery"; speaker, Mr. Norman Tanner; chairman, Professor John Loewenthal.

September 13, 4.45 p.m., "Closed Abdominal Injuries"; speaker, Mr. E. V. Barling; chairman, Professor John Loewenthal.

September 20, 4.45 p.m., case presentation; speakers, Mr. A. J. Johnson, Mr. P. A. Tomlinson.

September 27, 4.45 p.m., "Current Research in the Department of Surgery"; speakers, the Unit; chairman, Professor John Loewenthal.

October 4, 4.45 p.m., "Indications for Various Radio-therapeutic Methods"; speaker, Dr. John Hardcastle; chairman, Dr. H. J. Ham.

#### SURGICAL SEMINAR AT ST. VINCENT'S HOSPITAL, SYDNEY.

A SURGICAL SEMINAR will be held on Friday, August 26, 1960, at 5.30 p.m., in the Students' Lecture Theatre, Fifth Floor, St. Vincent's Hospital, Sydney. Mr. F. G. Smyth, of Port Moresby, will discuss "Adamantinoma in New Guinea Natives". All medical practitioners are invited to be present.

#### SEMINARS AT ROYAL PRINCE ALFRED HOSPITAL.

THE following alterations to the programme for seminars at the Royal Prince Alfred Hospital, Sydney, are announced:

September 2, Cardiology Section, "The Assessment of Diagnostic Criteria in Cardiology", Dr. A. D. Jose; Sep-

tember 9, Gastro-Enterology Section, "Post-Gastrectomy Syndromes", Mr. Norman Tanner, Charing Cross Hospital, London, by invitation; September 16, Neurology Section, "A Study of 30 Years' Experience with Cerebral Tumour at Royal Prince Alfred Hospital", Mr. J. N. Segelov; September 23, Hematology Section, "Nutritional Macrocytic Anemias", Professor J. B. Chatterjee, Calcutta School of Tropical Medicine (by invitation); September 30, Renal Section, "Renal Tuberculosis", Mr. H. M. Learoyd.

## Notes and News.

### Russian Papers on Neurology and Psychiatry.

Pergamon Press announce that arrangements have been completed for the quarterly publication of an English translation of selected papers from the well-known Soviet periodical, the *Korsakov Journal of Neuropathology and Psychiatry*. The English edition will begin with the first issue of 1960, and will contain English abstracts of all articles not translated. Dr. W. Ritchie Russell, Oxford, has agreed to act as English editor. Those desiring further particulars should write to The Pergamon Institute, Headington Hill Hall, Oxford.

### Lecture by Professor Georges Portmann.

The Alliance Française extends an invitation to members of the medical profession to be present at an address to be given by Professor Georges Portmann, Vice-President of the French Senate, Professor of Clinical Oto-Rhino-Laryngology, Hospital du Tondu de Bordeaux, and Leopold Bellan Hospital, Paris, in the Robert H. Todd Assembly Hall, British Medical Association House, 135 Macquarie Street, Sydney, at 8 p.m. on Wednesday, August 31, 1960. The subjects of Professor Portmann's address, which will be illustrated with coloured films, will be "What Point has Modern Medicine Reached?" and "Cancer Problems of Today".

### A Gastro-Enterology Journal

The British Society of Gastroenterology and the British Medical Association have joined forces to produce a new quarterly journal with the striking name *Gut*. The object of this journal is to publish original papers and reviews concerned with practice and research in the field of gastro-enterology. The field is described as that of alimentary, hepatic or pancreatic disease, and papers may cover the medical, surgical, radiological or historical aspects. They may also deal with the basic sciences concerned with the alimentary tract, including experimental work. The editorial committee is headed by Mr. Harold C. Edwards as editor and Dr. F. Avery Jones as editorial secretary. The new journal is handsomely produced in the style, now generally familiar, of the various specialist journals published by the British Medical Association. It is to appear quarterly, the annual subscription being £3 (sterling). It may be ordered direct from the British Medical Association, Tavistock Square, London, W.C.1.

### Professional Officers' Association Award.

A Melbourne research worker who has made a brilliant contribution to the scientific services of the Commonwealth Government shared the coveted Professional Officers' Association Award (Commonwealth Public Service) for 1959. He is Mr. R. T. Simmons, a consultant serologist with the Commonwealth Serum Laboratories.

The Award of Merit is presented annually to members who "by virtue of the outstanding nature of their contribution to professional work, are clearly deserving of personal recognition". Mr. Simmons receives the award for his contribution in the field of hematology. He is an internationally recognized authority on blood genetics and has published some 90 papers on the subject for scientific journals in the United States, Europe, Australia and Asia. Included are a large number of important papers published in *THE MEDICAL JOURNAL OF AUSTRALIA*. Professor Mark Oliphant, who recommended Mr. Simmons for the award, said that Mr. Simmons' survey work in the Pacific area had undoubtedly led to a great enrichment of knowledge of blood groupings in that region.



The official presentation of the awards will take place in Melbourne, in September, during the annual meeting of the Victorian Branch of the Professional Officers' Association. The other recipient of the award is Mr. R. W. Turnbull, the "father" of the P.M.G. Department's Extended Local Service Area (ELSA) system.

#### Sixteenth International Tuberculosis Conference.

The International Union against Tuberculosis announces that the sixteenth International Tuberculosis Conference will be held in Toronto, Canada, from September 10 to 14, 1961, under the presidency of Dr. G. J. Wherrett. An interesting scientific programme has been arranged, as well as visits to hospitals and clinics. Tours of the city of Toronto, and surroundings will provide opportunities to observe aspects of Canadian life. There will be a full-day trip to Niagara Falls and pre-convention and post-convention tours in Canada and the United States. Special arrangements for travel, with reduced fares for chartered aircraft, will be made through national travel agencies. Full details of the conference can be obtained from the General Secretary, Dr. C. W. L. Jeanes, 265 Elgin Street, Ottawa, Canada.

#### International Congress on Medical Photography and Cinematography.

The first International Congress on Medical Photography and Cinematography will be held on September 27 to 30, 1960, at Düsseldorf, Federal Republic of Germany. The conference is being organized by the German Society for Photography, and the President is Professor Doctor H. Schober. The official languages of the Congress will be English, French and German, and simultaneous translation will be available. There will be scientific lectures by experts in their fields, film showings and a "photokina"—an exhibition of all types of apparatus used in medical photography and cinematography. Some of the main topics of the lectures are as follows: lighting; optics; ophthalmology; surgery; dermatology; documentation, organization and instruction; emulsions, developing methods; endoscopy; television, projection; legal medicine; photography and cinematography for measuring purposes; photomicrography and cinemicrography; close-up photography and photomacrography; radiology; medical photography and cinematography at accidents; veterinary medicine; dentistry. Further information may be obtained by writing to the following address: Deutsche Gesellschaft für Photographie E.V. I. Internationaler Kongress für medizinische Photographie und Kinematographie, Köln, Neumarkt 49.

#### A Journal of Reproduction and Fertility.

A new journal, the *Journal of Reproduction and Fertility*, has been founded by the Society for the Study of Fertility to replace the annual volumes "Studies on Fertility" which have hitherto contained the proceedings of the Society and certain other papers. The journal is to publish original papers, abstracts of proceedings, and occasionally reviews and bibliographies dealing with the morphology, physiology, biochemistry and pathology of reproduction in man and other animals, and with the biological, medical and veterinary problems of fertility. It is to be published quarterly at 20s. per issue. The subscription price is 70s per annum, post free. All subscriptions should be entered with the publishers, Blackwell Scientific Publications Ltd., either direct or through a bookseller or subscription agent.

#### Permanent International Festival of Medico-Surgical and Scientific Films.

The eighth session of the Permanent International Festival of Medico-Surgical and Scientific Films, organized by the Association Nationale des Médecins Cinéastes et des Cinéastes Scientifiques de France, in association with the *Gazette médicale de France*, will begin in November, 1960, at the Faculty of Medicine of Paris. Producers of 16 mm. medico-surgical or scientific films, not released in France, who wish to take part in this film showing, should submit their entire no later than September 5. The Technical Committee appointed to judge the films will meet on that date. All entries must be addressed as follows: Association Nationale des Médecins Cinéastes et des Cinéastes Scientifiques de France, 23, Boulevard de Latour-Maubourg, Paris, VII<sup>e</sup>. Overseas entrants would be well advised to send their films to the Cultural Attaché of

their Embassy in Paris, in the care of their Minister of Foreign Affairs.

#### Johnson and Johnson Pty. Ltd. Acquires Controlling Interest in Andrews Laboratories Ltd.

Johnson and Johnson Pty. Ltd. has purchased the controlling interest in Andrews Laboratories Pty. Ltd., a company manufacturing ethical products, drugs and fine chemicals. The primary object of the Johnson and Johnson's acquisition of Andrews Laboratories is stated to be to provide an organization for the detailing and distribution of McNeil pharmaceuticals, products of the McNeil Laboratories Incorporated, which was acquired by the parent company in America recently. The new outlet will also permit the distribution of other overseas pharmaceutical products acquired by the parent company and becoming available shortly for distribution throughout Australia. Andrews Laboratories Pty. Ltd. will continue to operate as a separate organization; but the Managing Director, the General Manager, and the Financial Director of Johnson and Johnson Pty. Ltd. will join the Andrews Board.

### Naval, Military and Air Force.

#### APPOINTMENTS.

The following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 37, of May 26, 1960.

##### NAVAL FORCES OF THE COMMONWEALTH.

##### Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

*Appointments.*—Ronald Ford Barr is appointed Surgeon Lieutenant (on probation) (for Short Service), dated 25th January, 1960.

##### AUSTRALIAN MILITARY FORCES.

##### Australian Regular Army.

##### Royal Australian Army Medical Corps (Medical).

The resignation of 3/40170 Captain P. J. Shiels of his commission is accepted, 23rd February, 1960.

The notification respecting 3/12030 Captain (Temporary Major) S. H. R. Palmer which appeared in Executive Minute No. 111 of 1959 promulgated in Commonwealth Gazette No. 65 of 1959 is withdrawn.

The resignation of 3/12030 Captain (Temporary Major) S. H. R. Palmer of his Short Service Commission is accepted, 6th February, 1960.

*To be Captain (Temporary Major), 7th February, 1960, with regimental seniority and service for purposes of promotion effective from 7th February, 1958.*—3/12030 Samuel Henry Richard Palmer.

The notification respecting QX700208 Lieutenant R. N. Hurley which appeared in Executive Minute No. 20 of 1960 promulgated in Commonwealth Gazette No. 23 of 1960 is withdrawn.

##### Regular Army Special Reserve.

##### Royal Australian Army Medical Corps (Medical).

*To be Captain, 4th January, 1960.*—QX700208 Lieutenant R. N. Hurley.

##### Citizen Military Forces.

##### Northern Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional rank of 1/61875 Captain K. D. F. Martin is confirmed. 1/39211 Captain (provisionally) J. J. Herron relinquishes the provisional rank of Captain, 2nd March, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical) (Northern Command) and is granted the honorary rank of Captain, 3rd March, 1960.

##### Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—*To be Captain (provisionally), 30th March, 1960.*—2/127081 Gerald James Flynn.

##### Southern Command.

*Royal Australian Army Medical Corps (Medical).*—3/101048 Captain J. A. Hayman is seconded whilst in the United Kingdom, 31st March, 1960.

## Central Command.

*Royal Australian Army Medical Corps (Medical).*—4/32073 Captain (provisionally) J. S. T. Cox ceases to be seconded whilst in the United Kingdom, 8th February, 1960. 4/32073 Captain (provisionally) J. S. T. Cox relinquishes the provisional rank of Captain, 8th February, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Central Command), and is granted the honorary rank of Captain, 9th February, 1960.

## Western Command.

*Royal Australian Army Medical Corps (Medical).*—5/26514 Major R. Paton is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Western Command), 24th February, 1960.

## Reserve Citizen Military Forces.

*Royal Australian Army Medical Corps (Medical).*

*Northern Command.*—Honorary Captain R. M. Murray is retired, 30th April, 1960.

*Southern Command.*—Honorary Captain J. R. Searle is retired, 30th April, 1960.

*Central Command.*—Honorary Captain A. J. Chandler is retired, 30th April, 1960.

*Royal Australian Army Medical Corps (Medical).*

The following officers are placed upon the Retired List with permission to retain their rank and wear the prescribed uniform, 30th April, 1960:

*Southern Command.*—Colonel C. A. M. Renou, Lieutenant-Colonel R. N. Howard, E.D., and Captain M. Kelly.

The following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 48, of June 30, 1960.

## NAVAL FORCES OF THE COMMONWEALTH.

## Citizen Naval Forces of the Commonwealth.

## Royal Australian Naval Reserve.

*Promotions.*—Surgeon Lieutenant Ian Stuart Collins is promoted to the rank of Surgeon Lieutenant-Commander, dated 10th February, 1960.

## AUSTRALIAN MILITARY FORCES.

## Australian Regular Army.

*Royal Australian Army Medical Corps (Medical).*

*To be Captain 15th April, 1960, with a Short Service Commission for a period of one year.*—6/4011 Philip James.

*To be Lieutenant-Colonels, 27th April, 1960.*—Majors (Temporary Lieutenant-Colonels) 2/40110 D. C. Cook and 3/40123 A. P. Hanway.

## Citizen Military Forces.

## Northern Command.

*Royal Australian Army Medical Corps (Medical).*—1/46932 Captain (provisionally) N. C. Holmes relinquishes the provisional rank of Captain, 5th April, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Northern Command) and is granted the honorary rank of Captain, 6th April, 1960. The provisional appointment of 1/55872 Captain A. Ottone is terminated, 26th April, 1960. *To be Captain (provisionally), 27th April, 1960.*—1/55872 Alfio Ottone. *To be Major, 2nd May, 1960.*—1/39083 Captain (Temporary Major) R. Cantamessa.

## Eastern Command.

*Royal Australian Army Medical Corps (Medical).*—*To be Captain (provisionally), 3rd May, 1960.*—2/2937 Barbara Ellen Grahame.

## Southern Command.

*Royal Australian Army Medical Corps (Medical).*—3/101815 Major G. W. Cooper is appointed to command 6th Field Ambulance and to be Temporary Lieutenant-Colonel, 1st May, 1960. 3/82441 Lieutenant-Colonel D. C. Cowling relinquishes command 6th Field Ambulance, 30th April, 1960, and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Southern Command), 1st May, 1960.

## Central Command.

*Royal Australian Army Medical Corps (Medical).*—4/35233 Colonel J. D. Rice relinquishes command 104th Military Hospital, 30th June, 1960, and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Central Command), 1st July, 1960. 4/35230 Lieutenant-Colonel R. T. Binns, O.B.E., E.D., is placed upon the Retired

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JULY 9, 1960.<sup>1</sup>

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism .. ..	3	2	3(1)	..	..	..	..	..	8
Amoebiasis .. ..	..	..	..	..	..	..	..	..	..
Ancylostomiasis .. ..	..	..	..	..	..	..	7	..	7
Anthrax .. ..	..	..	..	..	..	..	..	..	..
Bilharziasis .. ..	..	..	..	..	..	..	..	..	..
Brucellosis .. ..	..	..	..	..	..	..	..	..	..
Cholera .. ..	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus) .. ..	..	..	..	..	..	..	..	..	..
Dengue .. ..	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile) .. ..	..	24(22)	10(5)	..	1(1)	2(1)	8	..	45
Diphtheria .. ..	..	..	1	..	..	..	1	1	3
Dysentery (Bacillary) .. ..	..	..	..	..	3(3)	..	..	..	3
Encephalitis .. ..	..	..	..	..	..	..	..	..	..
Filariasis .. ..	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice .. ..	..	..	..	..	..	..	..	..	..
Hydatid .. ..	..	1	..	..	..	..	..	..	1
Infective Hepatitis .. ..	76(34)	51(34)	15(4)	14(10)	7(6)	1	..	1	165
Lead Poisoning .. ..	..	..	..	..	..	..	..	..	..
Leprosy .. ..	..	..	..	..	4	..	..	..	4
Leptospirosis .. ..	..	..	1	..	..	..	..	..	1
Malaria .. ..	..	..	1(1)	..	..	..	..	..	1
Meningococcal Infection .. ..	4(1)	..	..	..	..	..	..	..	4
Ophthalmia .. ..	..	..	..	..	..	..	..	..	..
Ornithosis .. ..	..	..	..	..	..	..	..	..	..
Paratyphoid .. ..	..	..	..	..	1(1)	..	..	..	1
Plague .. ..	..	..	..	..	..	..	..	..	..
Poliomyelitis .. ..	..	..	..	..	..	..	3	..	3
Puerperal Fever .. ..	..	..	..	..	..	..	..	1	..
Rubella .. ..	..	8(7)	..	..	..	..	..	..	9
Salmonella Infection .. ..	..	..	1(1)	2(1)	6(5)	1	..	..	44
Scarlet Fever .. ..	11(4)	23(20)	..	..	..	..	..	..	..
Smallpox .. ..	..	..	2	..	..	..	..	..	2
Tetanus .. ..	..	..	..	..	1(1)	..	..	..	1
Trachoma .. ..	..	..	..	..	..	..	..	..	..
Trichinosis .. ..	..	..	..	..	..	..	..	..	..
Tuberculosis .. ..	11(7)	7(6)	13(6)	3(3)	3(1)	2(2)	..	..	39
Typhoid Fever .. ..	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne) .. ..	..	..	2	..	..	..	..	..	2
Typhus (Louse-borne) .. ..	..	..	..	..	..	..	..	..	..
Yellow Fever .. ..	..	..	..	..	..	..	..	..	..

<sup>1</sup> Figures in parentheses are those for the metropolitan area.

List (Central Command) and is granted the honorary rank of Colonel, with permission to wear the prescribed uniform, 13th June, 1960.

#### Tasmania Command.

*Royal Australian Army Medical Corps (Medical).*—The provisional rank of 6/15399 Captain T. H. S. Kirkland is confirmed.

#### Reserve Citizen Military Forces.

*Royal Australian Army Medical Corps (Medical).*

*Southern Command.*—The resignation of Honorary Captain R. G. Macdonald of his commission is accepted, 17th March, 1960.

The following officers are placed upon the Retired List with permission to retain their rank and wear the prescribed uniform, 30th June, 1960.

*Northern Command.*—Major C. F. Hecker.

*Central Command.*—Lieutenant-Colonels A. D. Byrne and S. J. Douglas.

*Western Command.*—Major H. M. Hill and Captain G. L. Myles.

*Tasmania Command.*—Lieutenant-Colonel J. E. Edis.

#### ROYAL AUSTRALIAN AIR FORCE.

##### Permanent Air Force.

##### Medical Branch.

The following are appointed to a short-service commission on probation for a period of twelve months, with the rank of Flight Lieutenant:—Michael Murray-Alston (0310778), 12th June, 1959; Peter Edwin Connor (019761), 26th April, 1960.

The following are appointed to a temporary commission, with the rank of Pilot Officer (student):—James MacDonald Reid (015330), 1st January, 1960; Donald Campbell Skinner (019754), 29th February, 1960.

The probationary appointment of the following officers is confirmed:—Flight Lieutenant (acting Squadron Leader) L. N. Walsh (039386); Flight Lieutenants M. Murray-Alston (0310778), W. O. N. Shields (0310779).

##### Air Force Reserve.

##### Medical Branch.

The appointment of Pilot Officer M. D. Silver (041265) is terminated, 1st May, 1960.

## Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Hooper, Nanette Catherine Mary, M.B., B.S., 1959 (Univ. Sydney), 56 Robey Street, Maroubra.

The undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

Ludlow, John, M.B., B.S., 1960 (Univ. Adelaide), 39 West Avenue, Northfield.

Filipic, Marijan, M.B., B.S., 1960 (Univ. Adelaide), 26 South Terrace, Adelaide.

The undermentioned has been elected a member of the South Australian Branch of the British Medical Association:

Willson, Henry John Welch, M.B., B.S., 1952 (Univ. London), M.R.C.S., L.R.C.P.

## Deaths.

THE following deaths have been announced:

HUME.—Patrick Huon Hume, on July 29, 1960, at Turramurra, N.S.W.

SPEIRS.—Norman Lennox Speirs, on August 1, 1960, in Queensland.

## Diary for the Month.

- AUGUST 15.—Victorian Branch, B.M.A.: Finance Sub-Committee Meeting.  
 AUGUST 16.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
 AUGUST 17.—Western Australian Branch, B.M.A.: General Meeting.  
 AUGUST 18.—New South Wales Branch, B.M.A.: Branch Meeting.  
 AUGUST 18.—Victorian Branch, B.M.A.: Executive Meeting of Branch Council.  
 AUGUST 19.—New South Wales Branch, B.M.A.: Ethics Committee.  
 AUGUST 23.—New South Wales Branch, B.M.A.: Hospitals Committee.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

*New South Wales Branch* (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

*South Australian Branch* (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

## Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2661-2-3.) Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

**SUBSCRIPTION RATES.**—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in Australia can become subscribers to the Journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £6 per annum within Australia and the British Commonwealth of Nations, and £7 10s. per annum within America and foreign countries, payable in advance.